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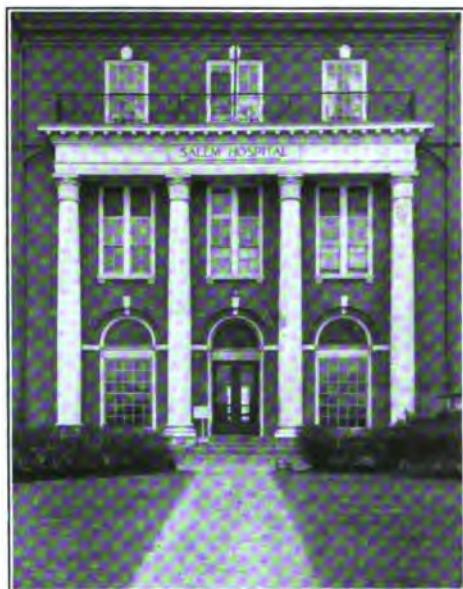
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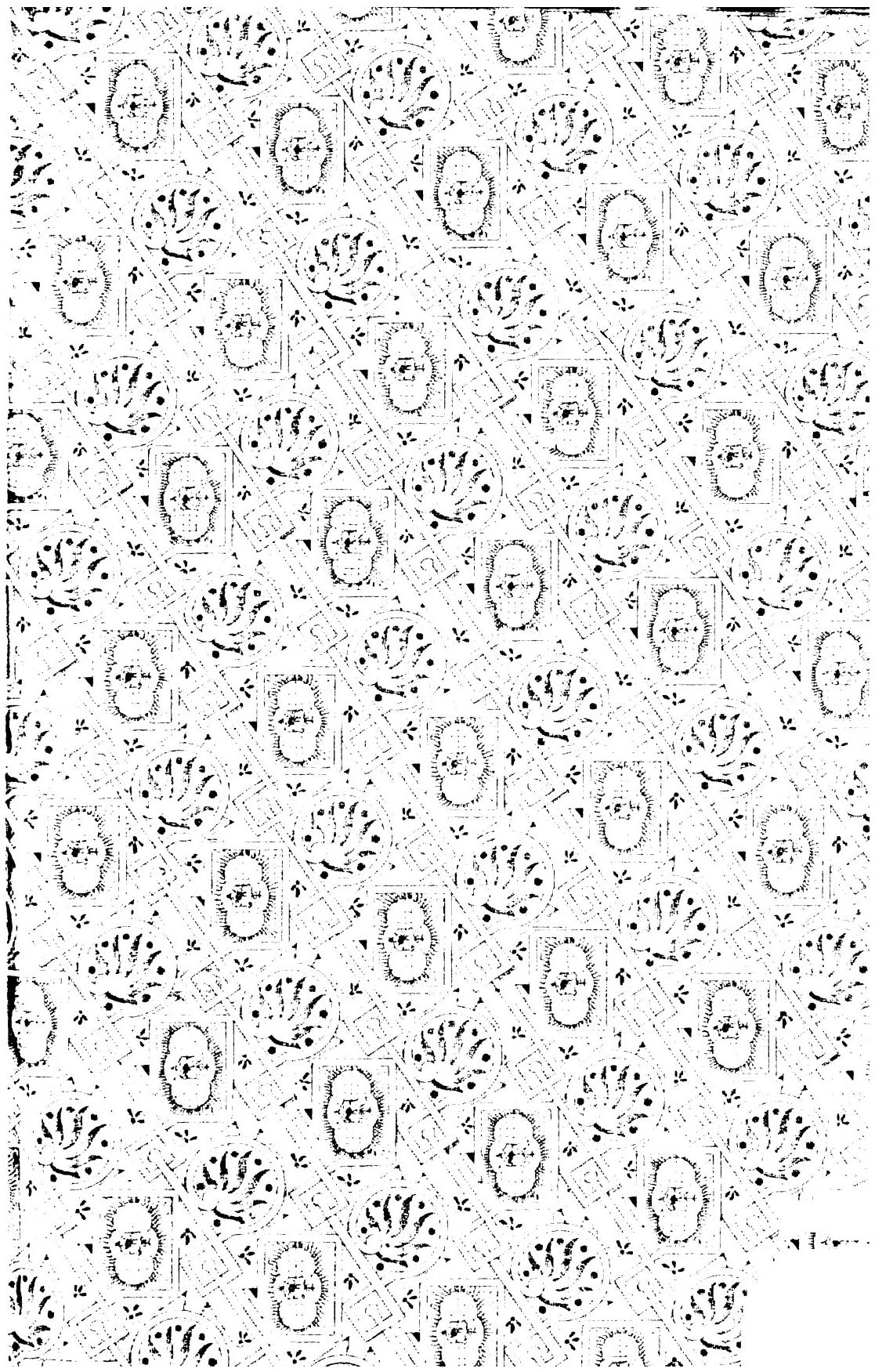
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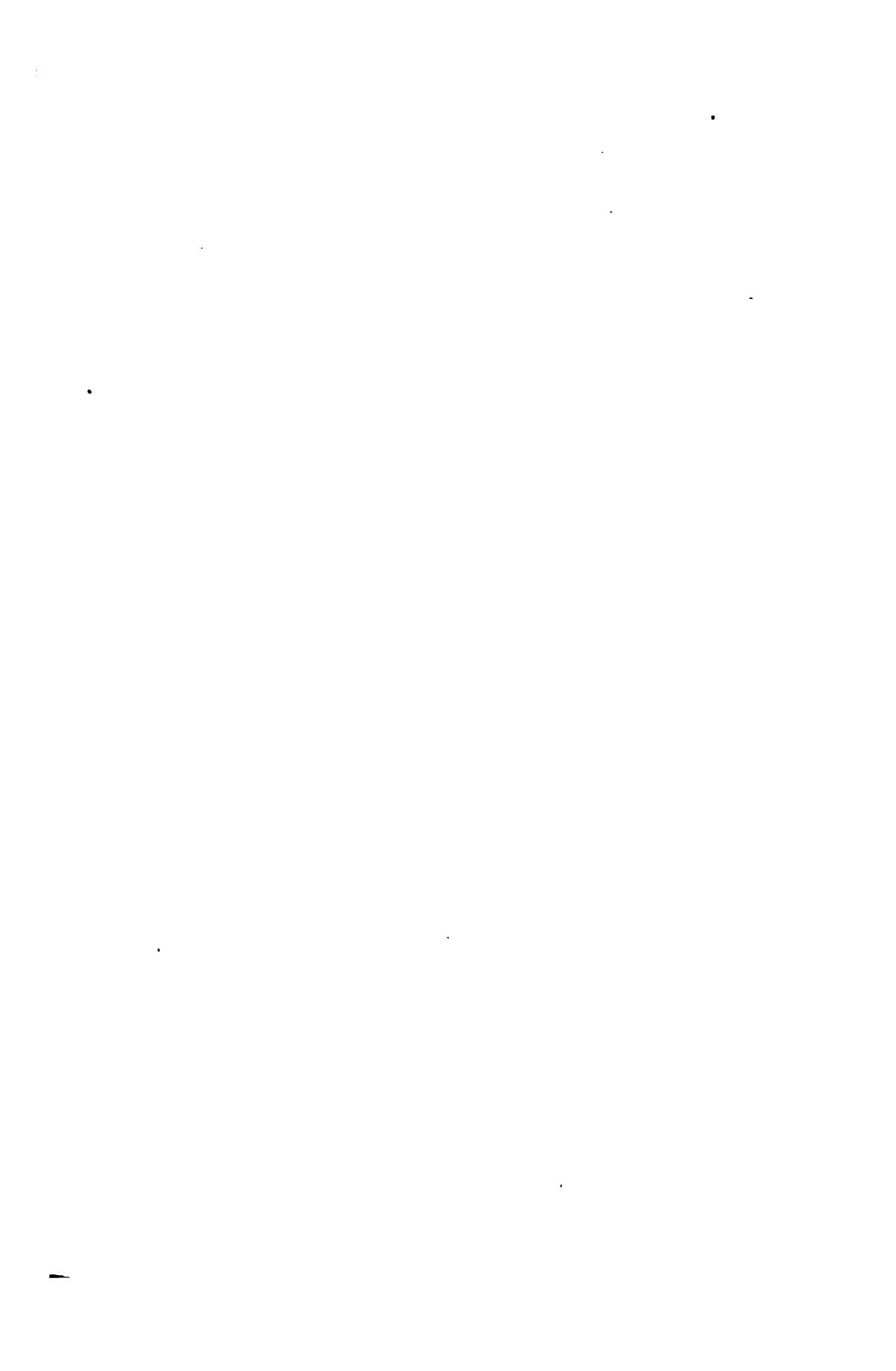
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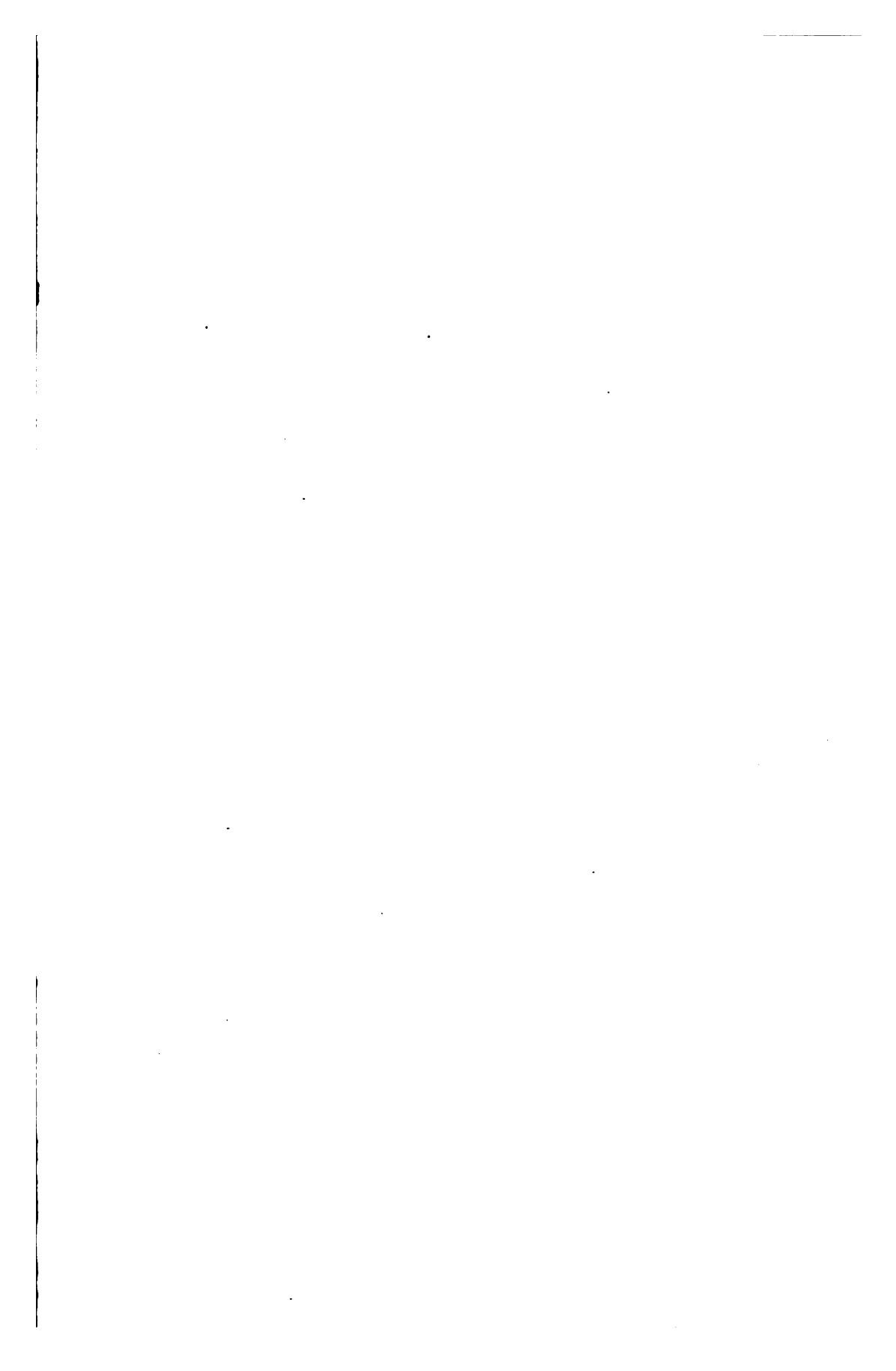
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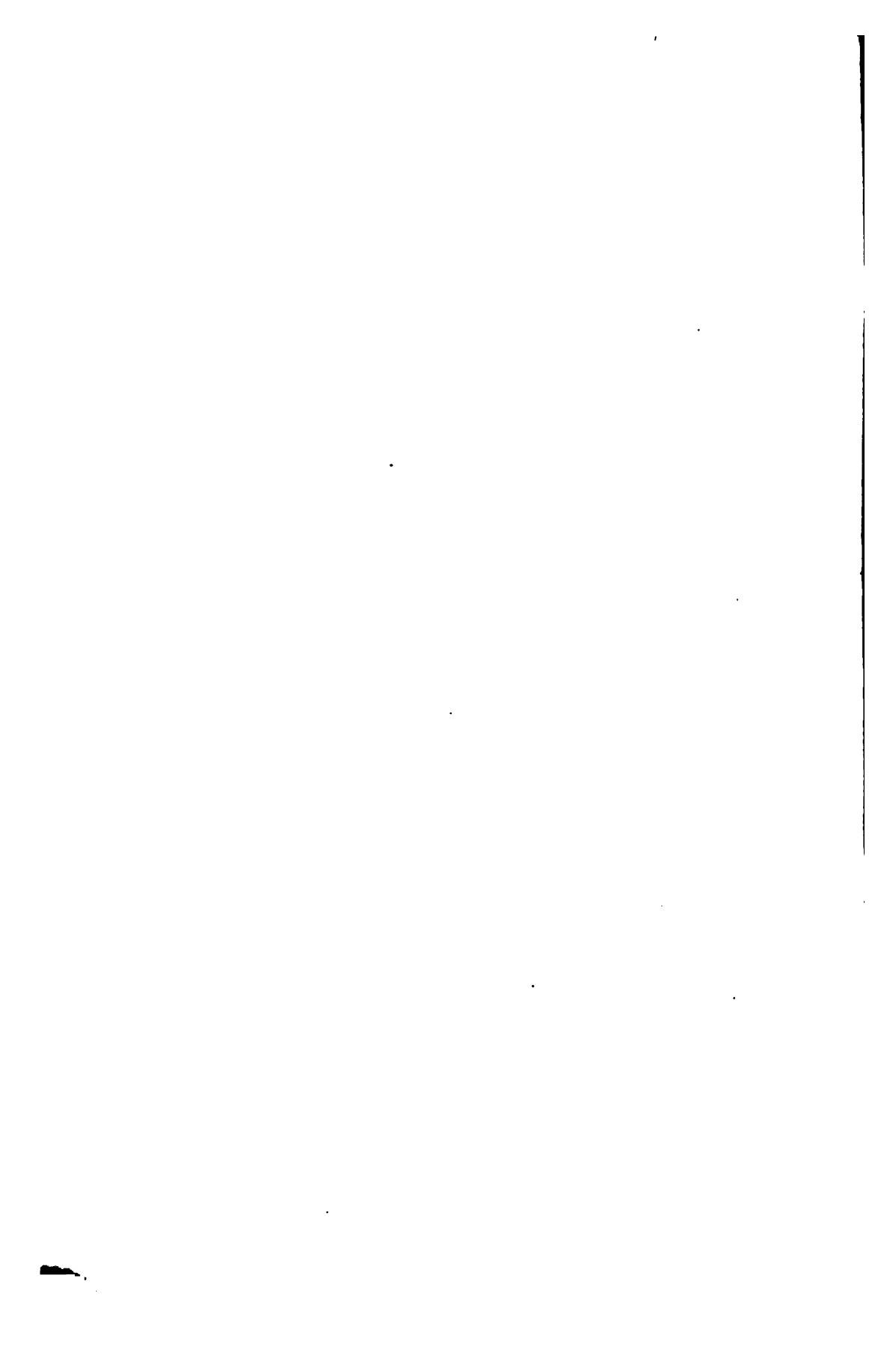












ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY
CHARLES E. SAJOUS, M. D.,
AND
SEVENTY ASSOCIATE EDITORS,

ASSISTED BY
OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
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DISEASES OF THE SKIN.

BY ARTHUR VAN HARLINGEN, M.D.,
PHILADELPHIA.

THE chief matter of importance to note in the department of dermatology is the interest manifested in bacteriology in its relation to the etiology of skin diseases. Walter G. Smith, of Dublin,¹⁶ in an address on "Recent Advances in the Etiology of Diseases of the Skin," says that a revolution is taking place in dermatology. Unna, in an investigation of sixty pure cultures from a series of cases of seborrhœic eczema, discovered no less than fifty different mucors, twenty different kinds of penicillium, five aspergilli, about a dozen forms belonging to the groups oïdium and saccharomyces, besides a goodly number of partly known, partly unknown, cocci and bacilli. An extensive flora dermatologica vegetates upon man, and more and more skin affections are being discovered to be due to vegetable forms. The chief investigations in this direction which have been made during the past year will be described in abstract in the course of the present report.

ANATOMY, PHYSIOLOGY, AND PATHOLOGY.

The Distribution of the Normal Sebaceous Secretions of the Skin.—Arnozan,²⁸⁷ as the result of some new and interesting investigations, shows that in a healthy adult the skin of the head is entirely covered with an oily film, as is also the upper part of the trunk, both anteriorly and posteriorly, the shoulders, and the pubic region. The rest of the surface (excluding the genitals) seems to be dry. Some individuals, however, show little or no oily secretion, even at the characteristic points. The nose and chin are, however, invariably oily. There is no difference between the sexes.

As regards infants, Arnozan had no opportunity to examine the newborn nor any under nine months. At this age he was unable to demonstrate, in perfectly healthy children, the presence of oil on the surface of the skin at any point.

The exact age at which the sebaceous secretion begins to show itself upon the surface has not been determined. We know, however, that by the age of 6, 8, or 10 the cutaneous oil begins to show itself around the nose, and on the chin, cheeks, and scalp. When puberty is established, the secretion is observed at all points. It diminishes gradually with advancing age, remaining longest on the nose.

Aubert¹⁷⁹ finds that the palms also secrete oily matters, a fact that was already understood, though apparently not observed by Arnozan.

Micro-organisms of Normal Human Skin.—Damman² says that these micro-organisms have never been thoroughly investigated. He gives notes of some investigations on new ground. He examined the skin between the toes, the cruro-scrotal region, the contents of the sebaceous glands of the face, the inner surface of the prepuce, the forearm, hairs and scales of the scalp, tip of the finger, and space beneath the finger-nail. From between the toes was obtained the *Bacillus epidermidis capsulatus*, a large, mobile bacillus with rounded ends. The *Bacillus gelatinosus*, composed of fine, slender, mobile threads, was also obtained from between the toes. From the tip of the fingers was obtained the *Bacillus fluorescens epidermidis*; from the inner surface of the prepuce, the *Bacillus luteus liquefaciens*; from the toes, cruro-scrotal region, and prepuce, the *Staphylococcus flarescens*, which may possibly be the "micrococcus flavescentis" incompletely described by Cornil and Bates.²⁰⁵

Another bacterium is the *Micrococcus flavescentis subsidens*, the locality of which is not mentioned.

Damman gives a description of each variety and their method of culture.

ACNE.

Acne Hypertrophicum of the Nose Complicated by Epithelioma.—Matignon¹⁸⁸ describes the case of a man of 67 years, with a well-marked hypertrophic acne of the nose, which was of large size and much deformed by round, mammillated growths, involving the sebaceous glands and exuding quantities of sebaceous matter. One of the masses having been removed by a ligature, an epitheliomatous ulcer supervened, and the growth gradually took on epitheliomatous transformation.

ACTINOMYCOSIS.

Actinomycosis of the Skin.—Majocci²⁸⁷ has observed four cases of this disease. He distinguishes two forms: the anthracoid and the ulcero-fungous. The anthracoid pursues a rapid course, with fever, sometimes septæmic in character. It is characterized by flat tumefactions, with a sieve-like arrangement of multitudes of small openings, with yellow granulations, from which thick pus exudes. In the neighborhood of the original lesion secondary lesions and subcutaneous chains of lesions form, which likewise open and give exit to pus, as in the case of the original lesion. The ulcero-fungous form of actinomycosis takes on a subacute course, with a tendency to chronicity. The variability of these clinical characters renders the diagnosis of actinomycosis sometimes difficult. The diagnosis depends upon the mode of invasion: by nodosities and tumefactions arranged in moniliform series, in circles, and in groups. The granular appearance of the lesions—suppurating, ulcerating, or tending to atrophy—are characteristic; also the mode of suppuration, in the form of distinct, transparent foci, with yellow points, under the thinned skin; the sieve-like or honey-combed surface of the developed lesions, from which exude yellow, purulent granules. In addition, the absence of lymphatic engorgement and the usual locality of the eruption—in the neighborhood of the buccal cavity—tend to confirm the diagnosis; which, however, can only be established with certainty by the microscopical examination of the yellow granular bodies.

Thiriar^{287 288} gives a case resembling in most respects the description above given. He thinks that the disease may be conveyed by rye or barley eaten by the patient. Hewlett⁶, shows conclusively that the disease known as "madura foot" is, in reality, actinomycosis, as Vandyke Carter had suggested several years ago. ["Madura Foot," by Gemy and Vincent, in this report, where a different view is taken.—ED.]

AINHUM.

Peña²⁸⁹ gives a well-reported case of this affection, with a sketch of the parts and microscopical sections, without, however, throwing any new light upon its cause. Winkler⁶ gives a brief abstract of twenty cases, without any new conclusion reached as to the nature of the disease. Removal seems the only treatment, but Murray⁶ has treated a case successfully by dividing the skin and

all the tissues down to the periosteum, on the side opposite to the seat of the disease. Bringier²⁶⁰ refers to a number of American cases of ainhum.

ALOPECIA.

Alopecia Areata.—Vaillard and Vincent²⁴⁸ describe a parasitic form of alopecia areata, with illustrations,—an excellent study of this form of contagious alopecia.

Treatment.—Blaschko²⁸⁷,²⁸⁸ reports the case of a man of 18 years, who had characteristic patches of alopecia areata over the scalp, with marked trichorrhexis, in whose case antiseptic treatment had been employed without avail. Blaschko then employed the faradic current; at first, every other day, then daily. The patient held one electrode in his hand, while another electrode was brushed over the right side of the scalp for five to ten minutes. The young hair began to grow on this side within three or four weeks, while on the left side no hair began to appear for a much longer time. Lassar²⁸⁷,²⁸⁹ reports two cases of alopecia areata cured by the employment of corrosive-sublimate lotions and other antiparasitic remedies. One, which had lasted three years, was cured in one year, while the other was cured in six months. Ferras²⁸⁷,²⁹⁰ has used douches and other hydrotherapeutic means by the aid of natural sulphurated waters with success. Bulkley²⁴⁵ uses a 95-per-cent. solution of carbolic acid,—first brushed over the affected surface lightly with a swab, and then rubbed in. In treating small, separate spots the peripheral zone is also rubbed. He seldom applies it to more than two or three square inches at a sitting. The application is a little painful at first. The remedy whitens and shrivels the skin, and sets up a little inflammation and desquamation. A second application may be made to the same spot after two weeks.

Tison,²⁴¹,²⁴² believing that alopecia areata is contagious, cuts the hair short, rubs in "liquor Van Swieten" (essentially a solution of sublimate), and then paints on each diseased patch a thick coating of iodized collodion, 1 part of iodine to 30 parts of collodion. At the end of a week this film loosens and begins to separate. Frictions with the sublimate solution are then used, morning and evening, until all the remaining pellicles of collodion have been removed, when a new coating of iodized collodion is applied. After three applications the downy, new hairs begin to appear. This treatment was first suggested by Chatelain.

Barthélémy,⁸ in a case of alopecia areata of six months' duration, involving the cranium, nucha, and eyebrows, used a solution of sublimate (1 to 1000), injecting hypodermatically, at first, one under each point at six different points. Six urticari-form patches were produced. Later, the number of drops and the number of injections were gradually increased. A dozen sittings were given in three minutes, without any disagreeable local or general symptoms. At the end of this time a general re-appearance of hair could be observed,—white, but abundant and active. Moty, the originator of this treatment, uses a 4-per-cent. solution of sublimate with a 2-per-cent. solution of cocaine. He gives one injection under the medium-sized patches and four or five injections around the larger patches, giving four sittings, with four days' interval. This is usually sufficient to bring back the hair. The derma must not be too much distended, or an eschar may result. This treatment, I think, should be instituted with great caution. Moty does not give the number of drops injected, but I believe six or seven have been used, and Barthélémy's process seems the safer. The treatment is worth a trial, when patients can be found willing to endure the operation.

Morel-Lavallée²⁴ uses scarifications, with antiseptic precautions.

Alopecia Prematura.—Paschkis¹⁶⁹ says that the tinctura saponis viridis, often used to shampoo the scalp, is sometimes too strong. He uses an ordinary soda-soap, dissolving about 1 ounce (31 grammes) in 1 pint ($\frac{1}{2}$ litre) of water, and adding some soda or potassa. He makes a lather and rubs it into the scalp ten minutes or more, often leaving it on for several hours before washing it off. After the scalp is cleansed, he applies one part of benzol (from coal-tar) mixed with ten parts of alcohol. When this fails to restore the hair, Paschkis uses a 1- to 3-per-cent. alcoholic solution of naphthol, or a solution of 5 parts of resorcin in 150 parts of alcohol and 2 parts of ol. ricini. He also thinks naphthol soap useful.

Another form of application is: quin. sulph., 1 part; sp. vini gal., 60 parts; aq. cologniensis, 30 parts. Sometimes the following is useful: tannic acid, 1 to 5 parts; alcohol, q. s. ad sol.; ol. amyg., 40 parts. In that form of alopecia which is accompanied by hyperidrosis Paschkis uses tonics and faradization. He has never

seen any good result follow from the use of pilocarpine, internally or externally.

Ohmann-Dumesnil, of St. Louis,¹² in an excellent practical article, states that he employs tonic treatment in some forms of alopecia prematura where the nervous system seems to be at fault. The following pill should be taken thrice daily:—

R. Strychnia sulphat., gr. $\frac{1}{4}$ (0.00108 gramme).
 Ferri redacti,
 Quinia bisulphat., $\frac{1}{4}$ gr. j (0.00500 gramme).
 M. flat capsul. no. j.

When starvation of the nerves seems to be present, the compound syrup of the hypophosphites (Fellows's) is ordered in 1-drachm (3.89 grammes) doses, thrice daily, with $\frac{1}{8}$ grain (0.00108 gramme) sulphate of strychnia in each dose. He finds doses of $\frac{1}{2}$ to $\frac{1}{4}$ grain (0.008 to 0.01 gramme) of muriate of pilocarpine in a powder, daily, at bed-time, in water, to be evidently of use. In alopecia areata, Ohmann-Dumesnil carefully distinguishes between the neurotic and parasitic forms. In the parasitic form he has the hair cut close to the scalp, and uses a solution of sublimate (1 to 750), or perhaps, preferably on account of its non-toxic qualities, a 3-per-cent. solution of creolin. This is used all over the scalp as a preventive. Sapo viridis is rubbed into the affected areas, and allowed to remain on for five minutes. After washing this off, a small quantity of the following ointment is rubbed in:—

R. Hydarg. bichlor., gr. j (0.065 gramme).
 Lanolini, $\frac{3}{4}$ (81.00 grammes).
 M. terge bene.

The latter should be applied twice daily, as a usual thing, but sometimes a less frequent application suffices.

Ohmann-Dumesnil uses the same internal treatment in neuritic alopecia areata as in pre-senile alopecia. Externally he uses, in some cases, cantharidal collodion to the affected area, and, after vesication has been established, a dressing of some bland ointment. As the collodion varies in its effect, it is to be applied at greater or less intervals. Recently, he has used Bulkley's treatment (described on page 4), but with some modifications. He applies the pure English carbolic acid twice a week, and over the entire area of the patch, however large, by freely swabbing. Those portions which are affected by the acid turn milky white in a few moments,

and, if they do not do this, are touched again in a few moments. If the parts that turn white show any very marked inflammatory action, they are passed over at the next sitting. Generally, however, there is at most but a slight amount of desquamation.

ATROPHY OF THE SKIN.

Under the title "*Atrophodermie érythémateuse en plaques excentrique*," Thibierge⁸³ reports the case of a woman of 25 years, showing on the right cheek a circular patch of two years' standing, the size of a three-cent piece, slightly depressed, pale-red, and disappearing under pressure. The skin seemed thinned over this patch. A similar smaller patch could be seen on the right cheek in front of the ear. These patches were different from those of maculæ and striæ atrophicæ and of facial hemiatrophy, because they were erythematous and progressed centrifugally, without any alteration of the surrounding skin.

Jadassohn⁸⁴ describes the case of a woman of 22 years, showing a symmetrical atrophy of six years' standing, consisting of bean- to coin-sized, red, thin patches; dark, bluish-red, irregular, slightly elevated patches of larger size, somewhat scaly; red stripes of efflorescence, and fine, white striæ upon the extensor surfaces. Recently, a lentil-sized, hard, papular, light-red efflorescence had appeared on the left forearm, which, within three weeks, sank to the level of the skin, or below it, leaving a wrinkled surface. The other lesions were said to have begun in the same way. The skin of the upper extremities generally was thin, smooth, shining, and brownish. Microscopical examination showed spaces between the elastic fibres of the superficial epidermis, with slight infiltration of the lower layers.

CORNU CUTANEUM.

Lewin,⁸⁵ reports a case in which three horns, each about one-third of an inch in height, grew from the palm of the hand. The case is believed to be unique.

DERMATITIS.

Epidemic Exfoliative Dermatitis.—Savill^{86, 87} describes an interesting series of cases occurring in the Paddington Infirmary; 163 persons, or 20 per cent. of all the patients, were attacked within five months.

The eruption usually began on the face, and extended to the limbs and sometimes the trunk. The lesions were papular at the beginning, sometimes becoming vesicular, and ending in profuse desquamation, casts of the fingers and toes sometimes coming off. Occasionally, the disease resembled rötheln, pityriasis rubra, or exfoliative dermatitis, but more frequently eczema. Alopecia and shedding of the nails were common. There was a good deal of constitutional disturbance, with fever; the disease ran a pretty regular course of about seven weeks.

Most of the patients were of advanced years, and 12 per cent of the cases ended fatally. The disease appeared to be mildly contagious. In five cases the eruption took on at first the form of serpiginous rings. General treatment did not appear to have much effect, but local parasiticides, as creolin, exercised a marked control on the disease, and even seemed to cut it off, when applied early. Bacteriological investigation showed the staphylococcus pyogenes, and occasionally another ill-defined micrococcus.

Dermatitis Calorica (Burns)—The Causes of Complications and Early Death After Severe Burns.—Silberman²¹³ says that after severe burns not only is there an alteration in the shape of the red blood-corpuscles, but there is also diminution in their vital properties, shown by their changed reaction to desiccation, heat, compression, salt solution, staining, etc. These changes, and the presence of numerous broken-up corpuscles, result in the formation of numerous thrombi, occluding vessels and causing stasis in various internal organs, especially in the lungs, kidneys, intestines, liver, brain, and subcutaneous cellular tissue.

These points of occlusion of vessels, which are most numerous and striking in the branches of the pulmonary artery, are formed during life. There results therefrom considerable obstruction to the emptying of the right ventricle, with consequent general venous stasis and corresponding arterial anaemia. These conditions produce haemorrhages, ulceration, and parenchymatous changes in various organs, explaining the dyspnœa, cyanosis, small pulse, lung affections, convulsions, and low temperature which may follow severe burns. The fatal result from comparatively limited burns in children, Silberman thinks, may be due to thinner skin, weaker resisting-power of corpuscles, and comparative weakness of heart and circulation.

Treatment of Burns.—Maylard²¹⁸ urges the immediate and thorough use of antiseptis. The burn, when exposed, is washed with a warm solution of sublimate (1 to 2000); it is then covered with green protective (perforated oil-silk) also steeped in the solution. Over this is placed a piece of borated lint wrung out of the same solution, and this is covered with gutta-percha tissue; the whole is enveloped in sublimated "gamgee" tissue and secured with a bandage. The dressing may be kept on for two, three, or more days, according to the amount of discharge, which, as soon as it appears through the dressing, necessitates the removal of the latter. The protective and gutta-percha tissue, after having been cleansed, may often be used again. This method of dressing saves the patient much pain.

Bardéleben,²²⁰ after careful cleansing with 3-per-cent. carbolic- or salicylic- acid solution, applies powdered nitrate of bismuth, and covers with impermeable dressing; the moistened powder is removed from time to time, only leaving the most adherent part.

Eruptio Æstivalis.—Holsten¹⁵⁷ gives an abstract of several papers, which have appeared under the titles "Eruptio Æstivalis," "Summer Prurigo," "Acne Prurigo" (Hutchinson), "Hydroa Vacciniformis" (Bazin), etc. The eruption occurs on exposed portions of the body, and is characterized by the formation of small, isolated vesicles, followed by crusts, loss of substance, and white, variola-like scars, appearing in spring or early summer, and due to exposure to sunlight. Berliner^{v.11, No. 10, 11},²²¹ describes a case and tabulates those previously recorded, making eighteen in all. He divides them into two classes, "Erup. Æstivalis bullosa" and "Erup. Æstivalis pruriginosa," the former being seen on the tender and susceptible skin of children, and the difference between the two being only one of degree. Buri²²²,^{Sept. 1, 1911} records a similar eruption in a girl of 6 years, beginning at the age of two and recurring every spring, lasting from four to six weeks. The eruption began, after exposure to a bright April sun, by the formation of small vesicles on the bridge of the nose, which returned on the following day and were followed by new lesions on the cheeks, leaving variola-like scars. Van Dort²²³,^{Mar. 1} reports a similar case, and refers to Hammer's work²⁰⁰⁶ indicating that the affection is caused rather by light than heat.

Dermatitis Herpetiformis (Duhring's Disease).—Elliott¹ reports several cases of dermatitis herpetiformis which appeared to be induced by moral shock, worry, and nervous depression, over-work, grief, and allied causes, and others depending upon hysteria, neuralgia, anæmia, and debilitating conditions. Drugs seemed of little use in these cases, and removal of the cause, change of scene, etc., seemed alone to do good. Locally, Elliott used ichthyol, in a lotion of 25 to 50 grains (1.62 to 3.24 grammes) in an ounce (30 grammes) of water, or, better, in the following combination:—

R. Ammon. ichthyol., . . . gr. xxx-xl (2.00-2.66 grammes).
 Ol. amyg. dulcis,
 Aq. calcis, . . . ss f₃ss (15.00 grammes).

This was rubbed in thoroughly several times daily, and allowed to remain on the surface; or sheet-lint, saturated in it, was wrapped around, and retained in place by bandages. Frequent starch-baths, to which, sometimes, bicarbonate of sodium was added, proved useful. When there was much hyperidrosis a decoction of white-oak bark was added.

Du Castel²¹² and Wickham³ describe cases of bullous and vegetating forms of Duhring's disease.

Dermatitis Medicamentosa.—James C. Maguire⁸¹ reports a case of bullous eruption from iodide of ammonium, with brief notes on copaiba and chloral eruption. According to Carl Szadek, our corresponding editor, of Kieff, Russia, Wicherkiewicz considers that a glycerite of tannin (1 to 3), applied on a thick layer of gauze and covered with paraffin-paper, forms an efficacious cure for drug exanthemata. The dressing should be bandaged on and changed daily. After the rash has subsided, a 2-per-cent. boric-acid ointment should be applied on rags for a few days.

Kurlureaux²² gives a case of dermatitis from inunction of 2 drachms of mercurial ointment, the symptoms resembling scarlatina, with a temperature of 104° F. (40° C.). Hypodermatic injections of corrosive sublimate subsequently administered failed to produce any eruption. The patient took iodide of potassium before the rash broke out, and showed a well-marked early syphilitic rash immediately after. Whether these circumstances modified the conditions cannot be asserted.

Holsten¹ reports a case of dermatitis tuberosa from iodide of potassium, with brief reference to the various forms of skin

eruptions produced by this drug. He found ichthyol solution a beneficial application.

DERMATOLYSIS.

Dermatolysis with Fibroma Molluscum.—Lamprey² reports an unusual case of dermatolysis, with an accompanying sketch, which is reproduced.

The patient, a negro of Sierra Leone, Western Africa, 50 years of age, and of small stature, stated that he was born with lumps on his skin, but gave no other history than that the larger growth had increased considerably in late years. The dermatolytic growth arose from the scalp, and hung down in soft folds over the lip, shoulder, and back, and was freely movable. It weighed about twelve pounds, and for convenience was carried in a bag. Numerous nodular masses of fibroma molluscum, from pea- to billiard-ball size, were scattered over face, body, and limbs.

DYSIDROSIS.

Dysidrosis of the Nose.—Hallopeau³ reports a case where the nose had been affected from infancy by successive eruptions of dysidrosis, with attacks of hyperidrosis, strictly limited to the ala and back of the nose. The localization and concomitance of these eruptions indicate their close relationship, and, in Hallopeau's opinion, should cause the rejection of the name cheiropomphlox sometimes assigned to this disease.

ECZEMA.

Eczema Parasiticum.—At the conclusion of a lecture on "Parasitic Skin Diseases, and Particularly Parasitic Eczema," Eichhoff⁴ states that the parasitic theory of eczema has caused great excitement in dermatological circles, two parties having immediately appeared,—one for, the other against, this theory. One party asserts that all we call "eczema" is of parasitic origin; the other, that the disease hitherto known as eczema is in no sense parasitic. [Eichhoff is to be understood as referring to German



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dermatologists, I suppose, as no such violent extremes are maintained elsewhere. However, Eichhoff wisely says that the truth is in neither extreme. Many eczemas are due to thermal or chemical irritation, or to stagnation of the blood; owing to the exposed location of the skin, parasites may readily lodge on eczematous surfaces, and thus give rise to the idea that they were the original cause. There is, however, a number of kinds of eczema clearly due to mycosic, *i.e.*, bacillar influence, as demonstrated by their origin, form, and course; a great variety of parasites is found in different cases.—ED.]

Eichhoff thinks it would simplify matters much if the name eczema were confined to those forms of the disease which are clearly of non-parasitic origin, while the parasitic forms might be termed "dermatitis parasitaria," to be subdivided as the etiological parasite in each case might subsequently be determined.

[I must say that this suggestion of Eichhoff's strikes me very favorably. While (unfortunately, perhaps) it completely transposes our present nomenclature, since dermatitis is at present the name given to the affections which Eichhoff proposes to call eczema, and eczema the title which is at present applied to those now ascertained to be parasitic, yet the change would be in the direction of final lucidity of classification and definition.—ED.]

Coming to more practical points, Eichhoff says that every organism, in order to grow and flourish, must have an appropriate soil. For the dermatophytes, a skin rich in the fatty secretions of the sebaceous and oil-glands offers an appropriate field of growth; wherever those glands stand closely together and are well-developed there these organisms will flourish. On the human body, the hairy scalp, all folds of the skin where two surfaces come in apposition, the naso-labial fold, the corner of the mouth, the fold behind the ear, the axilla, flexure of the elbow, the folds under the female breast, the groins, the popliteal space, the anal region, and the palm and sole are favorable localities for the growth of parasitic organisms. Under favorable circumstances other regions may be attacked, or the parasite may extend from its origin in one of the places mentioned to invade other parts of the surface.

The commencement of parasitic dermatitis is in the form of hyperæmia and slight infiltration, soon going on to a superficial desquamation characteristic of most forms of this disease.

Eichhoff here remarks that "eczema seborrhœicum" is the name given by Unna to this disease, and now generally accepted, on account of its localization in regions where the sebaceous glands are most plentiful; but he thinks the term dermatitis parasitica more correct.

When the parasite penetrates more deeply into the derma, the slight scaliness gives way to a more marked irritation, exudation, swelling, and vesication or pustulation.

The progress of dermatitis parasitica is in the form of circles or rings of increasing size, which often intersect to assume gyrate forms. The disease heals in the centre, as the parasite exhausts its nutriment and pushes out in its growth to fresh fields. The favorite seat of dermatitis parasitica is the hairy scalp, forming the well-known greasy variety of dandruff; why, however, the disease behaves so unlike a parasitic affection at this point Eichhoff does not tell us. It does not here commence at isolated points and grow in increasing circles; nor does it assume the form of that typical parasitic disease of the scalp, *tinea tonsurans*. [I have never been able to include dandruff of all kinds under Unna's "eczema seborrhœicum," though some forms, trespassing on the forehead and affecting the face simultaneously with the chest and back, seem to come under this category. It is still more difficult to look upon the ordinary dandruff as a parasitic disease.—ED.] Eichhoff regards chronic eczema of the face and scalp in children as a parasitic dermatitis, the parasite gaining entrance through the fatty crusts of the scalp in earliest infancy, and penetrating so deeply as to arouse extreme inflammatory action.

Chronic eczema of the palm and sole, known (in Germany) under the name of "psoriasis" palmaris and plantaris, is likewise regarded by Eichhoff as a dermatitis parasitica, as is also that form of eczema which so closely resembles psoriasis in the appearance and distribution of its lesions as to be differentiated in some cases only with great difficulty.

Eichhoff's paper is suggestive, but leaves much to be desired; no proof in the form of bacteria or cultures is brought forward, and the antiparasitic remedies which he mentions, as sulphur, tar, resorcin, ichthyol, etc., are not so invariably superior in curative effect to the old-fashioned, simply soothing applications as to lend weight to his sweeping assertions.

Treatment.—Besnier, the leader of the modern French school of dermatology, possesses an authority which makes his views on the management of eczema worthy of careful study.

Besnier,⁸ reminds us that the term eczema represents neither a lesion nor a disease, but is purely generic; that is to say, that it designates a dermatological genus of the most complex and confused kind of which the species, forms, and varieties have no precise signification unless accompanied by appropriate qualifying terms: *Local, disseminated, or general; from external or from internal causes; primitive or secondary, simple or complex; infantile, senile, gouty, diabetic, vesicular, pustular, moist, dry, exfoliating, papular, corneous, lichenoid, seborrhœic, hydrosic, acneic, follicular, pilous, toxidermic, palpebral, ocular, facial, auricular, buccolingual, intertrigonous, vulvar, anal, acarious, pediculous, varicose, etc., etc.*

Even for specialists grown old in practice the treatment of eczema is a difficult and ungrateful task, fertile in deceptions and miscalculations.

While it need hardly be said that the better an eczema is treated the quicker it will get well, we often meet eczemas which won't get well under the best treatment and others which get well unexpectedly under the worst.

Our prognosis, therefore, at the outset of a course of treatment should be given very cautiously, and with the utmost reserve as to gravity, duration, and probable relapse. Moreover, the responsibility of treating a severe case should never be assumed, unless one is able to follow it closely and to personally superintend all applications.

Besnier asks the question: "Should eczema always be treated?" meaning, should applications calculated to extinguish the eruption at the earliest possible moment be made in all cases. And here follow statements which, coming from less high authority, the reporter would be inclined to pass over in silence, or mention with repudiation, as the survival of exploded and obsolete medical theories.

Besnier says that "certain eczemas represent, in determined conditions, it may be, a surface of derivation or revulsion; it may be, a field of emunctory action; and there is no opportunity, therefore, to discuss the question as to whether it is prudent to suppress them."

[In view of the fact that the great Vienna school and many of the most eminent dermatologists the world over deny *in toto* the assumptions which Besnier seems to state as admitted facts, I think that, even in a popular paper such as the present one, some reference should be made to investigations or observations in support of these statements. For my own part, I would be willing to take a great deal on trust from Besnier, but having never met with any investigations going to demonstrate that an eczematous surface can draw off, so to speak, the attention of the system or of a *materies morbi* in the system, and threatening to attack some vital organ, I should be reluctant to admit the possibility of such a thing.—ED.]

Besnier goes on to say, that in *early infancy* the question of a rapid cure should *always* be raised, and the physician should *in all cases* intervene with *caution* and under *effective supervision*. The condition of the bronchi, of the brain, and of the digestive tube should be the *simultaneous* objects of his constant attention, and he should warn the parents of the necessity of such watchfulness.

[In reading such statements from the pen of the eminent French dermatologist, the idea is forced upon one that he must be addressing a particular audience, whose prejudices must be conciliated in order to obtain a hearing. I can conceive it possible that, in an audience of average middle-aged practitioners, the statement that an eczema could *not* be "driven in" would be met with incredulous smiles. But statements similar to those of Besnier were made by Brocq a year or so ago, and were criticised at the time in my report in the ANNUAL; so that it must be admitted that some such belief certainly exists among French dermatologists. Repeated requests on the part of skeptics to the advocates of the "driving-in" idea, that corroborative cases should be adduced, have never been complied with. The cases occasionally brought forward in provincial medical journals of infants dying in convulsions as the consequence of a too rapidly cured eczema, when considered as "proofs" of the doctrine of transfer of a *materies morbi*, move one to smiles.—ED.]

Other strange statements are made by Besnier in this connection. He says: "In adults the *location* of eczema upon the *hairy scalp* should always induce a research into the patient's *mental condition* and *hereditary tendencies*. In persons with a tendency

to brain-trouble (*cérébraux*) the medication should be *anodyne* and *quieting*, and should be carefully watched. It should comprise *derivation* and *revulsion* upon the digestive tube."

Similar caution should be observed as to the too rapid cure of eczema occurring in emphysematous and asthmatic persons, in those affected by dilatation of the bronchi, torpid pulmonary tuberculosis, and cases where the eczema occupies the thoracic region.

Even more caution should be observed in curing too rapidly all sorts and kinds of eczemas occurring in persons affected by hepatic or renal insufficiency, and most of all in diathetic subjects accustomed to morbid alterations.

Such is Besnier's advice. It reminds one of that sometimes given to children, not to be "too perfect, or they might die young." Various circumstances prevent most of us from putting this assertion to a practical test, and similar reasons have hitherto prevented our curing eczema of the character Besnier mentions with dangerous rapidity.

[The above strictures refer only to the absence of proof of the statements made. Under the influence of the Vienna school, too many of us are reluctant to admit any new ideas of this kind. The fact that the popular belief on this subject is shared by such eminent authorities as Besnier and Brocq should cause us to investigate the possibility of transference without committing us to any of the older theories of *materies morbi*.—ED.]

Coming to the more practical part of Besnier's paper, we note his advice as to careful regulation of the diet,—large sea-fish, shell-fish, pork, salt meats, game of all kinds, spices, etc., should be forbidden. The digestive tract should be looked after, "antisepsis of the intestine" practiced, and free evacuation and depuration of the liver and kidneys encouraged. These principles, however, should not be of a cast-iron character, but should be modified to suit the patient.

There is no general treatment of eczema; it is the eczema patient who is to be treated, not only according to the sort of eczema, but according to the diathetic condition of the individual. The physician who treats an eczema with the best result is he who analyzes with the utmost solicitude and attention the situation, surroundings, and habits of the patient, and who understands how to

rectify the hygienic conditions and re-establish all which may be defective in organs or functions.

Among internal medicines useful in eczema, alkalies are to be employed in a large number of cases and in all stages of eczema, especially in strong, vigorous persons, or in the obese, in congestive, uric-acid, and diabetic diathesis; sulphur is to be employed in young subjects and in the lymphatic; ergotine is to be employed in varicose eczema and in the congestive forms; arsenic, particularly in the form of arsenious acid, may be employed in the more advanced stages of chronic eczema as a modifier of the epithelial function, but *in patients who tolerate large doses of arsenic* this action may be utilized, in some cases, with very happy effect, *even in the active period* and in the most fluid eczemas.

In spite of the abuse of arsenic, Besnier says it is the special, not to say specific, agent in the treatment of eczema. In many cases, the hypodermatic use of arsenic may give results which cannot be obtained otherwise. Sterilized codliver-oil and iron preparations have their uses in some cases. Mineral waters are of use in chronic cases, but have no direct action on most cases of eczema; the particular water must be chosen to suit each case.

Coming to the local treatment of eczema, Besnier says that, after having suppressed all external causes of irritation, having cleansed the diseased parts and rendered them aseptic, and having placed the affected part in the most favorable position, three principal modes of dressing are adopted,—inert powders, moist fomentations, and oily applications. Each one has its use, according to circumstances and locality, and they may be used successively or alternately.

Starch-powder is best for large surfaces at first; the parts may then be covered with muslin or soft linen. Lycopodium, subnitrate of bismuth, dermatol, talc, etc., alone or associated, may be employed on isolated patches. The most important moist applications are the poultices of starch or of linseed deprived of oil; they should be prepared by ebullition, and the water used should have 5 to 10 parts of boric acid per 1000 added previously; the paste should be spread in *thin* layers, and the cataplasm should be applied almost cold. It is then to be covered with very fine, soft linen and carefully fastened in place with bandages. No form of treatment gives more relief during the acute stages

of eczema, if this is carefully applied and changed every three or, at most, six hours. In less severe cases or in later stages of the disease these moist applications may be made by covering the affected part with two or three turns of soft linen or muslin impregnated with emollient water, decoction of bran, starch-water, etc., covered with *thin*, impermeable cloths. The linen and other dressings should be disinfected or re-disinfected before each application; care should be taken to avoid creases and folds. If the patient is cold, or afraid of being cold, cotton or flannel may be applied over all. In some cases impermeable cloths may be used directly to the skin, but these should be made of the finest tissue, and not of that rubber-cloth which is sometimes employed to the patient's great detriment. All these modes of treatment, in reality, represent the continuous bath; their action is most favorable, both in giving relief to the patient and in curing the disease. Unfortunately, many physicians are ignorant of the details, or do not take the trouble to superintend their application. In some severe cases of acute eczema benefit is obtained from oleaginous applications,—fresh Carron oil, made with sterilized oil alone, or with the addition of a small quantity of laudanum, bicarbonate of sodium, boric acid, etc. The method of application is similar to that employed above, and with the same precautions.

Besnier goes on to speak of the other local applications employed in subacute and chronic eczema, but adds nothing to our general knowledge of this part of the subject.

B. W. Richardson ²⁸ has painted three parts of the surface of the body, in a case of eczema, with "styptic colloid,"—an invention of his own, containing tannic acid dissolved in ether and collodion,—with relief afforded by no other remedy; the colloid may be freely applied with a soft brush over the affected surface. It forms a loose scale mingled with the cutaneous scales and exudations; it causes no irritation, and may be repeated once daily so long as it is required; applied to the face, it lessens rather than increases the disfigurement.

Löwengard ²⁹ has used a 2-per-cent. dilution of creolin with success in various cases of infantile and other forms of eczema. He was occasionally obliged to substitute other remedies for the creolin in the course of treatment, but he succeeded in all cases in relieving the painful symptoms of the acute stage.

Leven,²⁰ in cases of chronic, stubborn, weeping eczema, employs solutions of nitrate of silver. In the case of a six-month-old infant, suffering from a weeping eczema of the face and head, a 1-per-cent. solution of nitrate of silver was applied on compresses, alternating with nitrate-of-bismuth ointment; the case was cured in fourteen days. Various other cases have been treated by Leven, with marked success. He employs a 1-per-cent. solution, applied on compresses, for half an hour at a time, several times a day. Between times he applies nitrate-of-bismuth ointment, which is to be carefully washed off before each re-application of the nitrate solution.

[The difficulty here, I think, lies in the frequent washing necessary to remove the ointment; I fancy it would be difficult to get a renewed growth of epithelium upon a surface washed so frequently. The treatment—which, however, except as to its peculiar method of application, is no new one—seems worth a trial.—Ed.]

Haffter^{214; 2}, says that a 4-per-cent. solution of nitrate of silver cures moist eczema, and particularly that form of eczema caused by the local action of corrosive sublimate and iodoform, with surprising rapidity.

Graham²², considers the absorption of toxic products, as a result of faulty assimilation or excretion, to be a frequent cause of eczema. He mentions the case of a child suffering from nearly universal eczema, where there was dyspepsia, with uric acid, and sometimes albumen, in the urine, when soothing applications to the skin, inducing alleviation in the eczema, diminished the excretion of uric acid and albumen,—a curious reversal of the ordinary sequence.

Graham finds Lassar's and Ihle's pastes very useful in eczema. As these are often referred to, the formulæ are here given, although they have been frequently published before:—

LASSAR'S PASTE.

R Acidi salicylici,	.	.	.	.	.	.	gr. x (0.65 grammes).
Vaselini,	.	.	.	.	.	.	3ss (15.50 grammes).
Pulv. zinci oxidii,							
Pulv. amyli,	.	.	.	.	.	ss 3ij (7.78 grammes).—M.	

IHLE'S PASTE.

R Resorcini,	.	.	.	.	.	gr. x (0.65 grammes).
Pulv. zinci oxidii,						
Pulv. amyli,						
Lanolini,						
Vaselini,	.	.	.	.	.	ss 3ij (7.78 grammes).—M.

Graham is wrong in attributing the introduction of "traumatincin," or, as Americans should always call it, liquor gutta-perchæ, to Auspitz. It has been in the U. S. Dispensatory for decades, and was used as a vehicle by many dermatologists years before Auspitz employed it. His reputation gave its employment an impetus, however.

Lassar⁴, urges the wider employment of the bath in skin diseases, particularly in eczema. He finds that acute eczemas can be treated with chrysarobin, tar, and other agents by employing the bath simultaneously, whereas, we are usually obliged to postpone the use of these valuable agents till a later date in the course of the disease.

Amsler, Sr., of Wildegg,²¹⁴ an old water-cure physician, it is to be supposed, emboldened by Lassar's statements, comes forward with the confession that he has for years treated—*sub rosa*, so to speak—multitudes of cases of eczema by means of sulphur mineral-water baths with great success. The great authority of Hebra having been thrown into the scale against the efficacy of baths, no one in Germany has had a good word to say for them in years. Now, however, that the influence of the Vienna school seems to be on the wane, we may see new and careful investigations made into the subject of balneology in its relations to the treatment of skin diseases.

ELEPHANTIASIS.

The Parasitology of Elephantiasis (Arabum).—Sabourand²²⁷ says that an examination of the history of patients suffering from elephantiasis shows that once or twice a month there is an excess of fever, while between times the affected parts are painless and indolent. The attacks begin by a feeling of local pain and discomfort, and a few hours after these prodromal symptoms the fever sets in, to a variable degree in different cases, and, at different times, in the same case. Sometimes the pyrexia lasts only a few hours, at other times it lasts for five days, and, in rare cases, even fifteen days. The local symptoms accompanying the fever are those of lymphangitis with ganglionic enlargements.

These attacks of lymphangitis with fever coincide with the invasion of the connective tissue of the hypoderm and of the associated lymph-channels by microbes. The firm œdema of elephantiasis is the result of chronic lymphangitis. The visible lesions are

the result of hundreds of febrile crises, each accompanied by a fresh advance of œdema, or, to speak anatomically, of diapedesis. Each new œdematosus deposit is not followed by a *restitutum ad integrum*, but probably by local organization of the emigrated embryonal cells into adult connective tissue. So far the identity of elephantiasis of temperate climates and that of tropical countries is identical. Thanks to the investigations of Wucherer, Lewis, Manson, and Lancereaux, we know that tropical elephantiasis is usually due to the hæmatozoon called *Filaria sanguinis hominis*, the disease produced by this parasite causing chyluria, lymph-scrotum, lymphoderma of the lower extremity, etc.

But this parasite is peculiar to palustral, warm countries, and cannot be the cause of our elephantiasis, and the question to be decided is as to the nature of the microbe which is evidently the cause of the latter form of the disease. Sabourand, observing the frequent intercurrence of facial erysipelas in his patients with elephantiasis, was led to suspect some connection between the diseases, and, by taking small quantities of blood and serum from the superficial vessels during an attack of lymphangitis, he was able to obtain in every instance cultures of the streptococcus of Fehleisen. He suggests that the filaria infection of tropical elephantiasis may co-exist with the invasion of streptococcus; that the latter may provide the opportunity for the penetration of the filaria into the economy. The practical deduction he makes is, that the strictest antisepsis should be practiced in connection with the treatment of elephantiasis, and that the therapeutics and prophylaxis appropriate to erysipelas are also proper for elephantiasis.

Congenital Elephantiasis.—Spietschka^{45; 287} reports the case of an infant born with well-marked elephantiasis. The face and limbs, with the exception of the right upper extremity and the genitals, were much enlarged; by the age of nine the genitals had also become affected, and all the symptoms of elephantiasis were present to an increased degree. The patient, although feeble, was not ill, and was of fair intellectual power.

EPHELIS.

Ephelia—How it Differs from Lentigo and Nævus Pigmentosus.—Moritz Cohn²⁸ gives the results of his histological researches as follow: 1. In circumscribed pigmentary affections

of the skin free pigment is found in granular masses, widely distributed in the lymphatics of the derma and epidermis; this is readily destroyed by peroxide of hydrogen. 2. Pigmented connective-tissue cells are also found to a greater or less extent; this pigment resists strongly the action of peroxide of hydrogen. 3. Certain connective-tissue cells—ramifying or not—are also resistant to the peroxide; these are found in small number at the boundary between the derma and epidermis, and sometimes send prolongations between the epithelial cells of the lower strata. 4. Pigment is also found about the nucleus of the epithelium, generally at one pole. 5. Cohn has observed nothing in his preparations indicating either a gradual metabolic development of pigment in the cellules of the derma or the epithelium; or an emigration of accumulated pigment from these cellules; or a passage of pigment by means of cellular prolongations from one cellule to another; or, finally, the presence of a peculiar kind of connective-tissue cells charged with the transportation of pigment. 6. Cohn considers that his preparations show positively: first, that pigment certainly exists in the lymphatic spaces of the skin; and secondly, that a whole series of different kinds of cellules are fitted to receive pigment.

Everything seems to indicate that, in man, the pigment of the epidermis comes from the derma. At any rate, there are indications that this view is more probable than that pigment is derived from the metabolic transformation of cell protoplasm.

Ephelides only appear on parts exposed to the sun, and are, therefore, to be carefully distinguished from lentigines and pigmentary nævi, which may occur on covered parts of the body. Lentigines can be seen with a lens slightly elevated above the surrounding skin and are always isolated, while ephelides are often confluent and are not raised. Microscopically, in nævi and lentigines, pigment is found in all the strata of the epidermis and in the derma down to the subpapillary strata. The vessels of the derma are always dilated and their epithelial nucleus swollen. Isolated masses of cellules and cellular chains are always met with, at least at the periphery; sometimes the whole derma is filled with them. In ephelides the vessels of the derma are normal; the pigment is only found in the basal layer of the epidermis, the derma being ordinarily free, though at times it contains traces.

ERYSIPELAS.

Carl Szadek, of Kieff, Russia, corresponding editor,⁶⁷⁸ mentions a case of erysipelas complicated by suppurative arthritis of the right knee, elbow, and wrist; the microbe found in the articular effusion proved to be Fehleisen's streptococcus. Galliard,³ reports a case of erysipelas of the face resulting fatally. The knee-joint was affected, with an uncommunicating channel of pus in the popliteal space; numerous staphylococci were found, but few streptococci. Galliard thinks the invasion of the staphylococcus was secondary, and attributes the malignancy of the case to the combination of the two infections. Hoel⁵⁷⁷ reports a case of erysipelatous lymphangitis of the face with cervical phlebitis of infectious origin. Unfortunately, no bacteriological examination was made which might connect the swelling and inflammation along the sterno-cleido-mastoid, the cephalic pains, and the fever with the co-incident appearance of erythematous or erysipelatous patches about the head and limbs. Hirtz and Vidal^{3, vi} report a case of relapsing erysipelas in which the streptococcus was found, showing that these mild cases of a relapsing character are true erysipelas, and not simple erythemas, as sometimes supposed.

Walter Reed, U. S. A.,⁹⁹ reports several cases of erysipelas occurring in succession, clearly as the result of contagion. Guyot,³ who has had charge of the erysipelas ward of the *Hôpital Beaujon* for seven years, is convinced of the contagious character of the disease, although in the entire course of his service he has never seen it conveyed. Endocarditis, he says, is very rare in erysipelas, as is albuminuria (*cf.* Galliard, in this report). He has never seen Bright's disease occur as a sequel to erysipelas. Le Gendre, Juhel-Rénouy, and Laveran, however, agree with Guyot, in believing erysipelas to be decidedly contagious. Rendu considers it by no means to be regarded as contagious to the degree shown by the ordinary eruptive fevers. Guyot and Renault consider sublimate dressings irritating, and liable to produce pigmentation.

Swine Erysipelas.—M'Fadyean⁵²¹ gives a very interesting and scientific study of this affection, which is due to a bacillus, and not to the streptococcus of Fehleisen.

Treatment.—Schneider and Niehaus⁸⁹⁶ revive an old treatment,—that of encircling the erysipelatous patch with a thickly-painted

layer of collodion. In their experience, this application does excellent service. The addition of 10-per-cent. ichthyol, as recommended by Sachs, seems, they think, to be of no particular advantage. Cayet²⁰⁰⁷; ⁵⁵ _{Dec. 24, 1861} recommends ethereal atomizations of sublimate, which he thinks more penetrating than fomentations. The area covered should be somewhat greater than the diseased patch. The strength of the solution is not mentioned; it is probably 1 to 1000. Allen⁵ _{July 24, 1861} recommends internally such systematic treatment as the case seems to require: antipyrin, in doses of 15 to 20 grains (0.97 to 1.30 grammes) for an adult, guarded by alcohol, in case of high or persistent fever (103.5° to 104° F.—39.72° to 40° C.); calomel or saline aperients, in full doses, if constipation, etc. Locally, he uses a paint of 1 to 2 drachms (3.89 to 7.78 grammes) of ichthyol in an ounce (30 grammes) of collodion, or on the hairy scalp a watery solution or ointment of ichthyol. To arrest the spread of the disease, he uses a band of adhesive plaster, or scarification, or both, the latter to follow the former in case the disease oversteps the adhesive strips.

Bourbon²⁰⁰⁷; ⁵⁵ _{Dec. 24, 1861} recommends $\frac{1}{2}$ milligramme ($\frac{1}{250}$ grain) of crystallized aconitum every six hours; it cures in two to three days. Kroell¹¹⁶ _{Dec. 24, 1861} employs elastic bands in such parts of the body as limbs and forehead to arrest the spread of erysipelas. The band must not be removed at once, on the cessation of the fever, but be retained until the swelling and bluish-red color have disappeared from the artificial border.

Wölfle²² _{Nov. 4, 1861} likewise recommends "the mechanical treatment." He uses bands of adhesive plaster, being careful to apply new bands before removing the old ones; should the erysipelas overstep the boundaries thus made, it does not usually proceed far. Tordaeus²⁹⁰ _{Dec. 1, 1861} recommends careful antiseptic precautions applied to the patient and his surroundings, isolation of the patient, etc. Locally, he uses sublimate (1 to 2000) in spirits of camphor. Injections of carbolic acid around the diseased patch, as recommended by Hueter, do good, but should not be used in infants, because of their great susceptibility to this drug; boric and salicylic acids may be substituted. Amici⁵¹⁵ _{Nov. 2, 1861} brushes the following solution over the erysipelatous patch:—

R. Hydrarg. bichlor., gr. ivss (0.80 grammes).
Glycerini, f³J (30.00 grammes).—M.

Klein⁸⁴ uses an ointment of equal parts of ichthylol and vaselin. Radcliffe⁸⁰ uses equal parts ichthylol, lanolin, and water. The skin is cleansed, the ointment rubbed in as well as can be borne, and a layer left on the surface; this is covered with salicylated gauze, and over that cotton. The dressing is to be changed twice or thrice daily. Winkler⁸⁴ has employed Lüke's treatment with marked success. Rectified oil of turpentine is brushed over the affected parts several times daily, the first application having been preceded by cleansing with ether or absolute alcohol; the applications should be made from without toward the disease, to prevent spreading the infection; a layer of raw cotton is bound over the turpentine application. Two to four hours later, according to the severity of the case, the bandage is removed and a new application of turpentine is made. Intense burning and itching follow the first few applications, but then relief is experienced. Any wounds or abrasions are carefully cleansed and dressed with 1-percent. sublimate-lanolin ointment. Sevestre⁸ uses baths at 34° C. (93.2° F.), containing 500 grammes (16 ounces) of borax, which he claims lowers the temperature, as well as tends to heal the eruption.

Galliard³ observed 350 cases of erysipelas between November, 1891, and May, 1892, among which only 3 cases occurred by contagion in the wards. He, however, urges isolation and disinfection. He observed albuminuria in two-thirds of his cases. Galliard uses salicylate of sodium and quinine internally, with alcohol, inhalations of oxygen, and hypodermatics of ether in adynamic cases. Locally, he uses cold applications only, and in high fever cold baths.

Dauchez¹⁵² employs salicylate of sodium to reduce the temperature in young and robust persons, and considers it highly valuable. Its use is contra-indicated in cachectic and feeble individuals, and in cases where the urinary secretion is faulty.

Carusi⁸⁴ refers to Fehleisen,²⁰⁸ whose classical work introduced a new era in the study of erysipelas by the discovery of the streptococcus which is its cause. After reviewing the various modes of treatment recently brought forward, he declares himself in favor of the hypodermatic injection of sublimate,—1 to 100, instead of 1 to 1000, as heretofore employed; $\frac{1}{2}$ gramme (about 8 minims) is injected. This treatment is worthy of investigation, but great caution must be employed in its use.

Bidwell²²⁴ uses injections of carbolic acid. Three minims (0.19 gramme) of a 1-to-20 solution were injected at eight points, three-fourths of an inch beyond the spreading margin of the disease, in an infant of 11 months (*cf.* Tordeus, in this report), and similar injections in other infants, with great success. The streptococcus is found beyond the margin of visible disease.

Hale²²⁵, uses aqueous solutions of nitrate of pilocarpine (as suggested by Da Costa), in doses of $\frac{1}{40}$ grain (0.0016 gramme) for infants to $\frac{1}{2}$ grain (0.032 gramme) for adults, keeping up a gentle diaphoresis, giving stimulants and food at the same time.

ERYTHEMA.

Erythema Multiforme Cured by Iodide of Potassium.—Villemin asserted before the French Academy of Medicine, on May 18, 1886, that the various forms of erythema multiforme are only varieties of the same morbid type, the disease being a specific general affection, of which the skin eruption is but a syndrome; and, finally, that erythema multiforme yields rapidly to iodide of potassium, which is a specific.

Other clinicians have failed to obtain Villemin's success in the treatment of erythema multiforme with iodide of potassium, but Guimbretière¹²⁷ reports a case cured in four days by the iodide given in 8-grain (0.518 gramme) doses four times daily.

Lewin¹²⁸ also recommends large doses of iodide of potassium; his extensive experience with this disease should give weight to his recommendation.

Erythema Nodosum.—Carter¹²⁷ reports two cases of erythema nodosum, accompanied by fever and severe general symptoms, with great variations of temperature.

Le Gendre and Claisse¹²⁹ report a case of streptococcic amygdalitis with eruption of purpura and erythema papulosum.

Erythema Nodosum; is it Contagious?—Lannois²²⁷ gives notes of four cases of erythema nodosum which appeared to have been conveyed by contagion. A case of acute articular rheumatism admitted to the hospital on December 25th showed a marked eruption of erythema nodosum.

On the 29th a convalescent typhoid-fever patient in the same ward, who had come in contact with the first patient, developed likewise a typical eruption of erythema nodosum.

On January 3d a third patient, who had been in the ward some weeks with mitral disease of the heart, was likewise attacked, and almost simultaneously a fourth patient, who had been in the same ward some weeks with nervous aphonia, showed a similar eruption. None of these patients had taken any medicine which could produce such an eruption; cultures of the blood were attempted in each case, but with a negative result.

Erythema nodosum being now admitted very generally to be an infectious disease, these cases may be supposed to indicate the possibility of contagiousness also.

FAVUS.

Unna²⁸; ⁵⁴ considers that there are three forms of favus:—

1. *Favus Griseus*.—Scutulum not very large, grayish-yellow in color, not depressed in the centre, with small hairs and lanugo hairs growing through it; the hyphæ branch at right angles, and grow straight outward, and from this characteristic he would name the variety of fungus “Achorion euthyphrix.”

2. *Favus Sulphureus Tardus*.—Scutulum very large, covering, often, the entire back of a mouse; it is thick and depressed in the centre, and of a pale, creamy-yellow color. The hairs do not grow through it; the hyphæ branch like forks, and Unna names it “Achorion dikroön.”

3. *Favus Sulphureus Celerior*.—Scutulum does not grow larger than a pepper-corn, and is depressed in the centre. At the periphery it is of a light-ochre color, getting white toward the middle, while at the margin of the depression it is often brown; the smaller hairs are pressed down, but the lanugo hairs grow through the crust; the hyphæ branch irregularly, and Unna names this variety “Achorion atakton.” Unna states that the depression in the scutulum is due to the growth of the fungus, and not to its relation to the hair-follicle, as it is also observed in cultures.

GANGRENE.

Spontaneous Gangrene.—Hebra²⁸⁷ reports the case of a young girl burned with boiling water from the palm of the hand to the lower third of the forearm; retracting cicatrices resulted. Ten months later, without apparent cause, three reddish patches appeared on the same forearm, which became suddenly gan-

grenous. The question suggested is, whether a neuritis ascendens may not have been the cause of the gangrene

DISEASES OF THE HAIR.

Canities.—Thornton² relates a case of sudden whitening of the hair under the influence of strong emotion. A lady, 37 years of age, received the news of the unexpected death of a brother. A fortnight later she noticed for the first time that the eyebrow and upper and lower lashes of the left eye, which had previously been nearly black, were flecked with white, and within a week every hair had become absolutely white. The hair under the other eye and on the scalp remained intact.

Moniliform Hair.—Abraham³ reports the case of a child, 2½ years of age, who had been born (and remained) almost bald. There was present on the scalp a little woolly growth of very brittle hairs, each presenting about twenty nodular enlargements; fracture occurred between the nodules. Colcott Fox said he had had for some years under his observation a family of three with an exactly similar condition of the hair. The mother (over 50) had been quite bald for years, and the daughters, aged 16 and 13, were rapidly becoming so. He had found, from a section of the scalp in one case, that the condition extended down to the bulb of the hair. He thought it was a developmental defect.

Hypertrichiasis and Mental Derangement.—Andrea Cris-tani^{605; 6} has written a paper on this subject. He has investigated two hundred and seventy-two cases of insanity in females and a similar number of sane women, with reference to the development of hair on various parts of the body in which it is not found under ordinary circumstances. The insane ranged in age from 20 to 80 years, while the sane were all over 65. He found that hypertrichiasis in the face, as well as elsewhere, is present much oftener amongst the insane than among the sane; that it is associated with signs of degeneration; and that it is more frequently present amongst insane patients in whom other signs of degeneration are present than amongst those who do not show degenerative symptoms. He also finds that the hairs are thicker and stiffer, and closely resemble those of the inferior races. The facts elicited are curious and interesting, and they are not easily explicable.

HERPES.

Herpes Febrilis, or Double Herpes Zoster.—Hallopeau and Barrié²⁵⁷ reported to the Société de Dermatologie et de Syphiligraphie a case where little groups of transparent vesicles appeared on both sides of the face, particularly the right, where they occupied the ear, malar region, upper eyelid, nose, upper and lower lips, down to the chin. The right eye was reddened by conjunctivitis, with a small ulcer of the cornea. On the left side of the face were two small groups of vesicles only,—one on the malar region, the other on the cheek. The eruption had been preceded by intense pains in the head, which still persisted, with weakness, chills, and fever; there was no anæsthesia.

The distribution of the eruption along the lines of nerves, and the involvement of the eye in connection with the eruption along the nasal nerve-twigs, together with the precedent neuralgia, seemed to indicate herpes zoster; but the bilateral character of the eruption, the fact of its attacking all three branches of the trigeminal, and the preceding phenomena of chills, fever, and gastric disturbance, together with the fact that the patient had had previous attacks of discrete herpes on the lips, ear, and nose, inclined the reporters to believe it a case of febrile herpes. Thibierge, in the discussion following, pointed out that the absence of eruption in the forehead and anterior portion of the scalp, which are almost always attacked in ophthalmic herpes, was strongly in favor of febrile herpes. The subsequent course of the eruption would settle the question; for, if cicatrices, with anæsthesia, failed to result, herpes zoster could be excluded.

[I am inclined to doubt if this diagnostic sign of herpes zoster would be admitted by all dermatologists. Cases of facial herpes zoster are certainly met with where cicatrices do not result, although when the forehead and scalp are affected, anæsthetic cicatrices have always resulted in my own personal experience.—ED.]

A somewhat similar case is reported by Barthélemy.²⁵⁷ The patient was a very old person, dying of generalized pneumonia (infectious pneumonia, with aphthæ of the oral cavity, etc.). A day or two before death, a patch of enormous vesicles, almost bullar, three by five inches in area, appeared over the right side of the thorax, with ecthymatous crusts. Barthélemy says that,

although resembling herpes zoster, this was really a febrile herpes, localized here instead of about the lips, nose, and throat, as ordinarily.

Herpes Vegetans of the Vulva Simulating Mucous Patches.—Bataille²⁸⁷ presented to the Société de Dermatologie et de Syphiligraphie the case of a girl of 18 years, without history or symptoms of hereditary or acquired syphilis or of previous herpetic attacks, who was suddenly seized with an abundant, yellowish-green, foul discharge from the vagina. A few days later, a chill, succeeded by headache, fever, and painful cramps in the limbs, was followed by an eruption of herpetic vesicles at the "root" of the right thigh (groin?), then on the vulva, on the left thigh, and in the anal fold, while the vaginal discharge increased in quantity.

The eruption was accompanied by burning and severe pain. The diagnosis of "giant herpes" was made; examination showed the swollen labia majora and minora covered with somewhat deep erosions, discrete above, confluent at the lower parts, red and bleeding to the touch, covered in places with a diphtheroid deposit. One of these erosions, situated between the fold of the clitoris and the right labium majus, the size of a five-cent piece, was chancriform in appearance; it rested on a hard base, with a red, granular surface and sharply-rounded contour. The lesions upon the thighs were those of confluent herpes. About the perineum and the adjacent skin of the thighs were deep ulcers, with a gray, diphtheroid base,—some polycyclic in outline, others circular and simulating chancreoids. On the inner surface of the labia minora a number of pea-sized vesicles could be observed,—some intact, others covered with a grayish pellicle, easily detached, and leaving a bleeding surface.

About the orifice of the urethra was a red erosion, secreting slightly and surrounded by several small vesicles.

The cervix uteri was found swollen and red, with lips everted and secreting muco-pus, surrounded by polycyclic erosions and covered with a diphtheroid membrane. Numerous vesicles and erosions could be seen upon the vaginal walls, and the vaginal cavity was filled with an abundant, viscous, yellowish-green, foul-smelling discharge mixed with epithelial débris.

In the inguinal regions a pleiad of enlarged ganglia could be felt, which were extremely sensitive and painful on pressure.

Examination of the throat showed small vesicles on the tonsils, with enlarged, painless, submental ganglia on the right side.

During the following days new vesicles continued to form, while the patient continued to suffer from headache and neuralgic pains; new erosions also appeared about the genitalia. Within a few weeks the process seemed arrested, and the ulcerations began to heal, but showed a marked growth of hypertrophic vegetations, enlarging into permanent masses of a violaceous red color, firm, circular, or segmented, with ulcerative bleeding surfaces picked out with yellow points, and resembling closely the hypertrophic growths often found on syphilitic ulcers in this locality.

As careful research failed to show any history of hereditary syphilitic disease or recent infection, Bataille thought that, unless the lesion near the clitoris should have been an initial syphilitic lesion concealed amid the herpetic eruption, the whole affection could only have been non-syphilitic.

Fournier thought Bataille's case a very interesting one from a clinical and also from a medico-legal point of view. He thought it extremely difficult to distinguish cases of herpes of this kind from syphilitic lesions of a similar appearance. He calls these lesions "false mucous patches," and thinks them more common than generally supposed.

They are derived from several different origins: 1. Vegetating and syphilitoidal papules succeeding ordinary erosions in contiguous parts of the skin, as between the thighs, and associated with eczema, intertrigo, etc. Jacquet has studied some of these cases, to which he gives the name "post-erosive syphiloids." 2. The papulo-eruptive lesions forming the second stage of the affection called "herpes vacciniformis" of young infants. 3. The papulo-eruptive lesions which, in certain regions, as the scrotum, the fold between the thighs, the genito-crural regions, succeed the vesiculations of dermatitis herpetiformis. 4. Certain lingual desquamations of an as yet undetermined character. 5. Buccal hydroa. 6. Verrucæ planæ, accidentally eroded. 7. Certain ecthymatous lesions which, under various conditions, vegetate and constitute small papules truly syphilitoidal in appearance. Ecthyma scabiosa is of this nature. 8. Syphilitic chancre, the papular transformation of which is well known. 9. Chancroid, which sometimes becomes covered by vegetations.

That which all these affections occasion, herpes may also give rise to, as seen in Bataille's case. Barthélemy cited a similar case where one of the inguinal glands suppurated.

In connection with this subject, we may refer to a case reported by Jamieson²⁸, where patches of tinea circinata on the shoulder and between the nates took on precisely the appearance of mucous patches.

HERPES ZOSTER.

Berbez¹⁰⁰ gives a critical review of the history of this affection, which was known to Celsus and Pliny, but seems to have been lost sight of until the last century. Barenprung first drew attention to the nervous origin of the disease; Landouzy demonstrated the infectious nature of some cases, while Kaposi and others described its occurrence in epidemics. Later, the hereditary tendency to its occurrence, its association with muscular paralysis, and its occurrence on mucous surfaces have been established. The rest of Berbez's paper deals with a general description of the disease.

Hutchinson¹⁰¹ gives a case of severe and prolonged after-pains following herpes in an aged person; quinine and aconite appeared to give some relief. The same writer¹⁰² gives a case of herpes of the neck recurring every winter for many years. Bókai⁶₁₀₃ gives a series of cases where herpes zoster in one person seemed to give rise to varicella in another, and *vice versa*. The pre-eruptive adenopathy of herpes zoster is the subject of a communication of Barthélemy.²⁸⁷₁₀₄

In a previous communication²⁸⁷₁₀₅ he had reported a case of herpes zoster in which, from the beginning of the eruption, acute adenopathies of the axilla and crest of the scapula had been observed. He now reports a similar case in connection with zona of the fifth intercostal nerve of the right side. The patient, a man of 25 years, was seized with neuralgia of the right side of the chest, with slight fever. Examination showed the thorax intact; two small ganglia, well marked, situated below the spine of the scapula, at the summit of the subspinous fossa. These were certainly of very recent appearance; they were extremely sensitive to pressure. The eruption of herpes only began to show itself the next day. The enlarged lymphatic glands soon began to diminish in size, and disappeared at the end of a week.

Barthélemy, laying stress upon the pre-eruptive appearance of the adenopathy, suggests that herpes zoster is not a simple local lesion, symptomatic merely of a neuritis, which constitutes the sole disease, but rather that the neuritis, like the cutaneous lesion, arises from some general cause, toxic or infectious; this cause does not limit its action to the nervous system, but involves sometimes, not secondarily, but primarily, the lymphatic system corresponding to the cutaneous area which becomes the seat of the eruption. In this connection, the spontaneity of the affection, its sudden invasion, the absence of recurrence of herpes zoster, and the concurrence of certain general symptoms, as noted by Landouzy, must be taken into consideration.

This view would lead to the exclusion of those cases of herpetic eruption simulating herpes zoster, but due to injury of the nerves, etc.

Baudoin reports a case of herpes zoster of the thigh, with corresponding ganglia in the groin, and also a case of extensive thoracic herpes zoster, with much enlarged ganglia in the groin and in the axilla. In both of these cases the ganglionic enlargement appeared before the eruption.

ICHTHYOSIS.

Ichthyosis with Involvement of the Mucous Membranes.—Thibierge²⁷ reports the case of a child of 12 years, suffering with an extreme degree of ichthyosis, where the tongue and buccal mucous membrane were of a light opaline tint, with superficial creases intercrossed, and presenting the appearance called "scrotal tongue." The left side of the nasal septum showed the same condition, and there was a peculiar keratitis, resembling that of hereditary infantile syphilis.

Ichthyosis Foetalis.—Hallopeau and Watelet³, showed, before the French Dermatological Society, an infant 8 days old, appearing to have had the entire horny layer of the epidermis loosened; it could be detached, in places, in large patches; the subjacent skin was raspberry colored; fissures appeared at various points; the mouth was retracted, the eyes were closed, and the upper eyelids in a condition of ectropion. The infant nursed and seemed likely to live.

Besnier said the case did not look like one of foetal ichthyosis;

the skin looked as though covered with a layer of collodion or burned. Vidal said it looked like infantile syphilis; but Fournier objected that syphilitic infants look as if they had been boiled; this one as if it had been varnished. It was not like any case of foetal ichthyosis he had ever seen.

IDROSADENITIS.

Under the title "Suppurative Disseminated Idrosadenitis," Dubreuilh²⁹⁷ describes the case of a young woman of 20 years, who had suffered with the affection from the age of seven. The first lesions appeared on the hands and feet, and it had become gradually disseminated. Two years previously the face had become involved. The lesions began as a deep-seated, pinhead-sized, scarcely perceptible nodule, situated in the derma. The nodule gradually increased in size, and appeared on the surface as a red, elevated papule on an indurated base. By the end of two weeks the nodule became painful, and showed a pustule or abscess deeply imbedded in its centre. This opened later and healed, leaving a round cicatrix, from a millimetre (on the hands) to a centimetre (about the elbows and knees) in diameter. The evolution of the entire lesion occupied about a month.

These lesions came out continuously; in larger numbers, however, about spring-time and at the menstrual period. They were isolated, or, if grouped or coalescent, were so only by the occurrence of successive lesions in the same neighborhood. On the face and back they resembled acne. They were especially numerous on the hands and extensor surface of the forearms. There were a very great number of cicatrices all over the body, head, and limbs.

Microscopical examination showed the disease to begin in one or several neighboring sudoriparous glands, extending later to those near by. It consisted in an embryonal cell-proliferation in the interstitial tissue of the glomeruli. The tube of the gland was invaded later and obliterated, all vestige of the gland finally disappearing, and leaving only a dense mass of small cells, with a few epithelioid cells. The sebaceous glands were only invaded secondarily. No microbes could be perceived.

The affection is the same as that described by Brocq, in his text-book, by the name of "disseminated folliculitis"; by Bar-

thélemy as "acnitis and folliculitis"; by Politzer as "hyradenitis destruens suppurativa"; and by Bronson as "acne varioliformis of the extremities."

IMPETIGO.

Under the title of "Impetigo of Bockhart," Unna²⁸⁷ gives a description of this affection, which has been much misunderstood, and confounded at times with other diseases, notably eczema.

Bockhart²⁸⁸ showed that an independent pustular disease of the skin exists, caused by the yellow and white staphylococcus, and closely allied to two other affections formerly considered distinct,—furunculosis and coccogenic sycosis.

Unna gives a very interesting account of the historical development of our ideas on the subject of impetigo, too long for quotation here. He describes the typical impetigo as follows:—

The size of impetigo pustules varies. The smallest are minute, yellow points; the largest, impetigines of two or three centimetres in diameter. They average from pinhead- to lentil-size. Their form is roundish, but only the smallest are perfectly round. The larger ones are oval, and show small dentilated projections at their edges.

When of small size they are raised in the centre and slope gradually down to the surrounding skin, but when more than a millimetre ($\frac{1}{25}$ inch) in diameter the pustule of impetigo assumes its characteristic appearance, as if something had been dropped upon the skin. Without growing larger in diameter, the crust rises more and more, until its height may reach one-half to three-quarters its diameter. It there remains, unless broken, until desiccation sets in. The thinner the horny layer of the epidermis, the higher the pustule rises. The highest are found on the delicate skin of infants; the flattest, on the palm of the adult hand.

The color of the impetigo pustule is at first a clear sulphur-yellow; later, if the pustule persists, it changes to the yellowish green of an old abscess. At first the content of the pustule is not usually transparent, later it is waxy yellow, the smaller lesions looking as if a drop of melted yellow wax had been dropped upon the skin. This secondary change signifies that the suppurative process has become arrested and serous exudation has taken place.

The surface of the pustule is at first smooth and pointed; later, it becomes globular, and the cover is so elastic that it can be

pressed down into the pus-cavity, rising again when the pressure is relaxed. If the pustule ceases to grow, the cover gradually becomes wrinkled by desiccation and flattened in the centre, while the edge rises abruptly from the surrounding skin. The pustule of impetigo is, however, never umbilicated.

The base of the pustule, after discharge of its contents, is white or yellowish-white, and may be dried by gentle pressure without causing any bleeding, showing the papillary layer of the skin smooth and flattened.

The inactivity of the tissues immediately surrounding the pustule is highly characteristic of impetigo. In many cases there is no areola whatever, and, when this exists, it is irregular and mottled. If intense inflammatory symptoms, as oedema and a hard, infiltrated base, are present, complications, as dermatitis or eczema, are associated, or the pustules are not those of impetigo.

The pustules of impetigo form very rapidly, sometimes in six or twelve hours, but they then take on a much slower development. The yellowish-green color persists some time, then the pustule begins to dry into a firm, brownish crust, only slightly adherent to the skin and soon detached, having a slight umbilicated depression, which soon disappears. Simple, non-complicated impetigines never have a cicatrix. The complete desiccation of a pustule occupies from two to fifteen days, but, as new pustules are apt to form constantly, the exact duration of the disease cannot be stated. The new pustules in every case are caused by new inoculations from without, and they are so disseminated as to leave no doubt that the disease is carried by the nails in scratching, etc.

The pustules of impetigo are apt to be pretty uniformly distributed over the trunk by rubbing and bandages. When the clothing rubs, where plasters, ointments, or cataplasms have been applied, the formation of new foci of the disease may be expected. Sometimes scratching produces the disease in long, narrow tracks. Occasionally, infection on a large scale may give rise to a general outbreak of impetigo resembling an exanthem.

Certain circumstances of structure and locality may give rise to variations from the typical impetigo as above depicted. Thus, on the face, especially in young infants, the impetigines are at times surrounded by a more or less pronounced red areola and have a more rapid evolution. In the neighborhood of the large

hairs of the beard and axilla the lesions are very uniform in size, and correspond to the enlarged opening of the hair-follicle. These pustules are always pointed, and must be distinguished from the lesions of sycosis, though they are frequently the precursors of the latter.

Impetigines may occur on the scalp. They are likely to be confounded with a number of other crusted affections of this locality. Though torn in combing, the secretions of impetigo do not mat the hair as those of eczema and other diseases having a fibrinous exudation. Crusted exudations of the scalp should not lightly be termed impetiginous. The yellow color of the crusts does not signify a purulent character. It is only when pure pus is found under the crusts, or furuncles follow their removal, that the presence of impetigo is to be suspected. Here the scalp-lesions may be accompanied by typical impetiginous crusts elsewhere, which serves to settle the diagnosis. It is unlikely, says Unna, that pediculi can cause impetigo through the transmission of pus, because they live on the hair rather than the skin, but they may induce the disease indirectly through scratching.

Impetigo gives rise to little or no subjective sensation, so that patients may be unaware that they have the disease. It never itches like eczema, but large lesions may give rise to some feeling of painful tension at times. It is not, therefore, conveyed by scratching.

As regards the histology of the pustule of impetigo, Unna says that it is simply a lenticular collection of pus situated beneath the horny layer of the skin, between this and the prickle-cell layer, which remains intact. Between the horny layer and the pustule, diminishing generally in quantity from centre to periphery, are small collections of pus cocci, in grape-like forms. In the collections of pus these cocci are scattering and more rarely perceived. They are entirely absent in the prickle-cell layer and in the derma. Unna goes on to describe the probable mechanism of this condition, and then speaks of the causation of those furuncles occasionally met with in connection with impetigo. He seems to think these proceed through external transfer of infection by means of the hair-follicles. This leads to the suggestion of local sterilization by applications, which, nevertheless, cannot for some time penetrate so far as through the epidermis, and consequently cannot at first present those relapses so frequent in impetigo.

Impetigo Herpetiformis.—Dubreuilh,²³⁷ in an elaborate article on this subject, describes the affection as follows: The eruption consists of pustules which contain from the first a thick, white, or yellowish pus. The lesions are pinhead-sized, rarely as large as a lentil, superficial, with a thin epithelial covering. They appear one or several at first, multiplying rapidly in groups, so that in a few hours, or in a few days, the groups are half an inch to an inch in diameter. These groups are circular or oval, formed of closely-placed, but distinct, pustules, seated upon a red, inflamed, slightly indurated base. The erythema always precedes the pustulation by one or two days, or accompanies it, and forms a sort of zone of invasion around it. When the group has reached a certain size, often not larger than a lentil, the centre dries up, forming a thin crust surrounded by a pustular ring. The lesion thus formed continues to grow in size, extending centrifugally and remaining of a regular, circular shape so long as it remains isolated. It forms a band of one-third of an inch to an inch in width, or more, of a deep-red color, sometimes slightly infiltrated and covered with pustules of the average size of a millet-seed. These pustules, white or yellow in color, are ranged in ranks closely together, but without absolutely touching, and surrounded by erythema. Toward the centre the pustules become confluent, rather by multiplication than by extension of the individual pustules, so that the thin epidermic covering becomes torn off in a sheet.

Immediately within the circle of pustules a narrow zone of red, excoriated, and weeping tissue is often observed. The central part is covered by thin, laminated crusts, of a greenish-yellow, brownish, or darker color, under which the skin is seen to be inflamed and the mucous layer laid bare. A little later the crusts fall off, and the deep-red, brownish, or livid skin becomes covered with a dry, thin epidermis, which exfoliates in large scales. Under certain circumstances the crusts do not form. The area of the eruptive circle is occupied by an excoriated skin of a deep-red color, weeping and painful. At points where two surfaces come together, as in the groins, inner surface of the thighs and perineum, axilla, etc., the excoriated skin inflames and becomes covered with a pulpy, grayish coating, horribly fetid, and recalling the odor of macerated, flat condylomata. The extension of the patches

of eruption is variable. They may extend over an area of a double-palm size, and then become confluent in large sheets, with a moist, exuding surface, covered with crusts or scales, and surrounded by a border of pustules arranged in arcades. At other times, the circles of pustules do not grow larger than the size of a silver dollar, but multiply greatly, so as to dot the skin all over. These appearances are shown in Kaposi's lithographic pictures, some of which were reproduced in the ANNUAL for 1889. Occasionally, the pustules are arranged in a double line along a scratch, indicating auto-inoculation. Artificial experiments in this direction have proved negative, or nearly so. Whatever the mode of progression, it may result that vast areas of the skin are inflamed, and denuded of epidermis.

The individual pustules, although small, are elevated and well-rounded, as a general thing, although they are occasionally found flaccid.

The eruption of impetigo herpetiformis may involve the mucous membranes, particularly that of the mouth, to a degree varying from a few transitory erosions to a complete invasion of the lips, buccal mucous membrane, tongue, and throat, with grayish ulcerative surface, and accompanying fetid breath. On the lips the eruption, in such cases, forms blackish crusts, under which the mucous membrane is found excoriated, deeply fissured, and bleeding.

Conjunctivitis is of possible occurrence. The vulvar and vaginal mucous membranes may be attacked. Ulcerations of the cesophagus, evidently due to similar lesions to those on the skin, have been observed. The nails and hair become fissured and friable, or may fall, without necessarily having been affected by the eruption directly. The patches of eruption may heal at one point, while in another new ones are coming out, or all the areas of eruption may heal simultaneously. The skin dries, desquamates repeatedly, and finally leaves a deep-red stain without cicatrix, which may endure for a long period.

A slight papillary growth is sometimes observed on the lesions, but these cases, when profuse vegetations have been observed, were probably not impetigo herpetiformis. Among the accessory eruptions observed with impetigo herpetiformis are transitory erythema and urticaria, the patches sometimes preceding those of the impetigo. A case has been noted where a benign attack of im-

petigo herpetiformis was cured within a month, but each patch became the seat of a well-marked patch of psoriasis, which was afterward cured by pyrogallol.

The eruption of impetigo herpetiformis begins on the lower part of the abdomen, about the genito-crural region or the breasts, and is always most extensive in these localities. The eruption may attack or extend to any portion of the surface, but seems to have a predilection for the trunk. The subjective sensations accompanying the eruption of impetigo herpetiformis are slight. Itching is occasionally present, but not to a marked degree.

The general health is profoundly altered by the invasion of impetigo herpetiformis. This change does not always show itself at first. Fever is always present at one time or another. It is moderate in degree, occurring in irregular remissions, each attack being ushered in by well-marked chills, lasting from a few minutes to several hours. The attacks of fever generally coincide with fresh outbreaks of the eruption. This fever is accompanied by prostration, sometimes going on even to coma; absolute anorexia; thirst, with a coated and sometimes fissured tongue; delirium and various nervous disturbances, convulsions, contractions, partial opisthotonus, pain in the muscles, formication in the extremities, nystagmus, lightning pains in the legs, localized paresis, and incontinence of urine and faeces, the latter probably dependent upon the prostration, rather than upon lesions of the nervous system. The patient generally dies in collapse. Diarrhoea, sometimes bloody, is invariably present. Vomiting is often noted, generally of a bilious character. Albuminuria is also a constant symptom.

The prognosis of impetigo herpetiformis is grave, though less fatal than has been asserted. Of twenty-four cases which have been reported, thirteen ended fatally, and some of the patients died in subsequent attacks. It can only just be asserted, therefore, that impetigo herpetiformis is not *necessarily* fatal.

Fatal cases generally die in a month, while cases which recover last several months. The disease may last from two weeks to five months.

No treatment thus far devised has influenced the disease, excepting the continuous bath. This gives relief in all cases, and appears to have contributed to the cure of those who have recovered. Impetigo herpetiformis generally appears during pregnancy; de-

livery is usually premature, and death or recovery may follow, but the eruption never gets well before accouchement.

Children born in the course of impetigo herpetiformis of the mother die within a few days or a few months. They are usually free from eruption, but one case has been noted presenting some lesions.

Dubreuilh gives the histology, the etiology, and diagnosis of the disease, which is liable to be confounded with dermatitis herpetiformis (Duhring's disease), pemphigus, pemphigus vegetans, and "chronic pustular dermatitis in groups with excentric extension" (Hallopeau). The nature of impetigo herpetiformis remains as yet quite undiscovered.

IXODISM.

Ixodism.—Under this title, Losada¹⁰⁸⁷ gives an account of the various *ixodes*, or ticks, which attack human beings. The dog-tick, he says, may produce severe symptoms of an urticarial character; the cause appears to be the introduction of formic acid into the system by the bite of the insect. The tick should be extracted at once, after which lotions of vinegar and water will suffice to relieve the skin symptoms.

LICHEN.

Lichen Scrofulosorum, a Tuberculosis of the Skin.—Hallopeau²⁸⁷ gives a description of a typical case of this affection, and alludes to the discovery of the bacillus of tuberculosis in the papules of this disease made by Jacobi and also by Sack,²⁸ to which he gives his adhesion.

Hallopeau concludes that lichen scrofulosorum is not an affection *sui generis* for which scrofulous subjects offer a favorable field, nor, as Jamieson asserts, a lichen circumscriptus modified by locality; it is due, as Beshier has maintained, to an infectious inflammation of the pilo-sebaceous follicles. We can now assert that this affection is due to a localization, in predisposed subjects of tuberculosis, in those organs which, under its influence, react according to a special manner; this predisposition appears to be very exceptional, and is only met with in young subjects.

Thibierge³¹¹ also reports a case of lichen scrofulosorum in a child of 14 years.

Kaposi²⁸⁷ reports a case where a bullous eruption of pemphigoid character was found on an eruption of lichen ruber.

Lichen (of Wilson) Accompanied by Intense Crises of Pruritus and Cured by Thermotherapy.—Jacquet²⁸⁷ mentions a case of this form of lichen which broke out in a woman after a series of worries and troubles, producing a nervous condition. The case was characterized by crises of pruritus, occurring when the patient undressed, or after meals, occasionally without appreciable cause. These crises were really furious; the patient's friends were obliged to leave the room, and the attack, when after a few minutes it had passed off, left her in a state of extreme nervous exhaustion. When the patient came under Jacquet's care, the disease had lasted three or four months. Hot douches were given daily, and after a week or so decided improvement had taken place. A relapse occurring, two douches a day were ordered, and at the end of several months an entire cure had been obtained. Jacquet cited a similar case also cured by hot douches. He also uses envelopment and compression.

Quinquaud, in cases resisting this treatment, sends his patients to high altitudes with success. On account of the nervous element, separation of the patient from his surroundings and ordinary habits of life is useful.

Lichenifications of the Integuments.—Under this title, Brocq¹⁰⁰ speaks of the different ideas held on the subject of lichen by the older English and French writers, as Willan, Bateman, Biett, Cazenave and Schedel, Rayer, Devergie, Gibert and Bazin, and, on the other hand, by Hebra and his followers of the Vienna school. The *lichen pilaris* of the former is now called ichthyosis or keratosis pilaris; their *lichen urticatus* is included under urticaria; their *lichen tropicus* under the sweat eruptions; their *lichen agrius*, and *prurigo mitis* and *formicans* have been included by Hebra and Besnier under prurigo; their *lichen simplex*, acute and chronic, and their *lichen circumscripatus* have been included by Hebra under eczema.

Thus, according to the Vienna school, the old lichens no longer exist as a morbid group. The lichens, according to Hebra, include only those dermatoses which are not only characterized by papules, but of which papules are the only and persistent lesions. Hebra's division of lichen, as is known, includes only *L. scrofulosorum* and *L. ruber*, of which the former is really only a pilosebaceous folliculitis. Brocq²⁸⁷ thinks this revision of the

group lichen too radical, and not in accordance with daily clinical experience. He thinks that the subject should be taken up and studied anew. Putting aside *L. ruber*, which is admitted by all, and excluding *L. scrofulosorum* entirely from the group of lichens, Brocq studies the complex observations ranged by old authors under this name. He begins by propounding a theory of lichenification of the integuments.

When a traumatic influence is exercised unremittingly upon any precise point of the integuments, the skin at this point gradually becomes modified in its appearance, its texture, and its function. Thus are produced professional changes in the skin,—those due to the pressure of corsets, of hernia-trusses, etc., and particularly the changes due to incessant scratching and rubbing of the skin. Jacquet has shown that cutaneous alterations, consisting essentially of a chronic inflammation of the integument, are produced with great rapidity under these circumstances. The derma is gradually infiltrated with embryonal elements; becomes thick, hard, and rugous; the papillæ hypertrophy and group themselves irregularly, to form papules having no relation with the pilosebaceous or with the sudoriparous apparatus. Before long the skin assumes a peculiar and characteristic appearance; the natural folds are exaggerated in quadrilaterals, with more or less infiltration of the integument, which loses its softness and normal consistence. Such is the morbid process to which Brocq gives the name of *lichenification*.

This process of lichenification does not always occur in the skin as the result of scratching, rubbing, etc.; it occurs more or less rapidly, moreover, according to the disease predisposing to it, and to the peculiar tendency of the patient's constitution.

Lichenification may occur in a skin apparently healthy. Here it is *primitive*. In the cases above described it is *secondary*. But it is not a disease in itself, and this is where mistakes have been made by previous writers on both sides: one party, having observed it in connection with eczema, has concluded it is eczema; the other, having observed it as occurring without previous skin disease, has placed too much importance on this fact, and has divided it, according to the various circumstances under which it may occur, into varieties of one great dermatosis, to which the name lichen has been given.

The "primitive lichenifications," as Brocq calls them, are divided into two sub-classes,—the circumscribed and the diffuse. The former corresponds to the *L. circumscriptus* of the older authors or the *L. simplex* of Vidal. Brocq describes this with some minuteness.

The second sub-class he considers the more important, because rare and hitherto undescribed. It begins as a pruritus at certain points on the surface, usually symmetrical, and after lasting as a simple pruritus for a considerable time, gradually assumes, under the influence of scratching, etc., a condition of "lichenification." The skin is covered with large patches of reddened, infiltrated, rugous disease, somewhat diffused and resembling lichenoid eczema.

Its aspect is acute or subacute rather than chronic, and it may be accompanied by patches of the circumscribed lesions. We have not space to give a further abstract of Brocq's paper. He describes, however, the clinical aspects of the affection quite fully.

As to the lichenifications secondary to pre-existing dermatoses, including those connected with eczema and psoriasis, and with the prurigo of Hebra, Brocq describes the latter with especial elaboration, and follows with a section on the diagnosis of lichenifications of the integuments.

The general treatment consists in removing, as far as possible, all causes of nervous excitement and worry and in obtaining calm and repose for the patient,—nervous sedatives, valerian, the bromides, hydro-therapeutics, particularly warm douches (35° C. to 38° C.— 95° F. to 100.4° F.), and revulsives to the spinal column.

For the pruritus, fractional doses of tincture of belladonna, 1 to 4 drops, three times a day; or, failing with this, 2-grain (0.13 gramme) pills of carbolic acid, 3 to 8 daily. If an urticarial element exists, quinine with ergotin may be used where belladonna fails. Arsenic, particularly the arseniate of sodium, associated in arthritic cases with benzoate of sodium or lithium, or bicarbonate of sodium, may be employed, avoiding digestive disturbance. In the latter case the arsenic may be given by hypodermatic injection.

In some cases the arsenical waters of Bourboule seem to be useful externally, as well as internally. In Hebra's prurigo of children Brocq uses codliver-oil in winter, arseniate of sodium and Bourboule water in the summer, with tincture of belladonna for

the pruritic attacks ; four days in the week, if these are prolonged. A visit to certain mineral springs is sometimes of use in adults.

As regards external treatment, the first indication is to protect the inflamed surfaces from injury. If these are moist, cold potato-starch poultices, or impermeable dressings of tarlatan, wet with infusion of chamomile, to which 1 or 2 per cent. of carbolic acid has been added, the whole covered with gutta-percha or rubber tissue, may be used. A solution of sublimate, 1 to 1500 or 2000, or of cyanide of potassium of the same strength, may be substituted for the chamomile. The poultices should be changed every three or four hours. So soon as the cooling and comforting effect of the cataplasma passes off and begins to be succeeded by warmth and burning it should be renewed. When, as is usual, there is not much acute burning or irritation, medicated plasters may be employed. Of these, Brocq prefers Vidal's codliver-oil plasters ; when there is not much discharge, they may be left in place twenty-four or forty-eight hours. The surface should only be cleansed occasionally. Oxide-of-zinc plasters, with or without salicylic acid, and menthol plasters may be used. If these are not irritating, but are insufficient, plasters of resorcin, pyrogallic acid, etc., may be used. When these plasters cannot be obtained, they may be replaced by some of the following preparations :—

The skin, once the acute irritation has been subdued, may be covered morning and evening by a thick coating of ointment composed of 15 parts of vaselin and 10 of oxide of zinc, to which has been added $\frac{1}{10}$ to $\frac{1}{20}$ part carbolic acid or $\frac{1}{10}$ to $\frac{1}{40}$ part menthol. The parts are then powdered with starch, or, in the folds, with oxide of zinc and talc. To clean this off, the parts are rubbed with pure vaselin, which takes off the oxide of zinc. Another excellent preparation is the *glycérolé tartarique* of Vidal, composed of 1 part of tartaric acid and 20 of glycerole of starch made with Price's pure neutral glycerin. These preparations should only be used when the markedly inflammatory symptoms have somewhat subsided. In acute conditions, especially when there is much itching, Brocq prescribes a glycerole containing 3 parts of tartaric acid, 2 parts of salicylic acid, 1 part of carbolic acid, and 54 parts of glycerole of starch. The glyceroles are less easy of application than the ointments, but are more readily washed off. Washes of hot water with vinegar, carbolic acid, hydrocyanic acid,

sublimate, etc., may also be employed for the pruritus. In stubborn cases, oil of cade, pyrogallic acid, and chrysarobin, ichthyl, applications of 40-, 20-, or 10-per-cent. nitrate-of-silver solution, followed by lanolin.

Lichen Planus (Acute Miliary).—Dubreuilh and Sabrazès⁷²⁰ refer to Lavergne's thesis, as also to the papers of Robinson, of New York, Török, H. Hebra, and Colcott Fox, and give two cases additional.

Lichen Ruber Acuminatus.—Weiss¹⁵⁰ reports a case of lichen ruber acuminatus.

LEPROSY.

Hallopeau²⁹⁷,²⁹⁸ reports the case of a patient who spent fourteen months in Martinique about 1855, returned to France, and had never subsequently been exposed to the contagion of leprosy, who yet developed the disease in 1887,—thirty-two years later,—and is now gravely affected. As Besnier has pointed out, this shows a latency rather than an incubation of the disease. The infectious agent introduced into the organism had rested absolutely inactive until a long subsequent date, when the tissues offered a suitable field for its growth, like the (fabulous) grain of wheat preserved two thousand years in a mummy-case, to be planted and produce a harvest at the end of that time.

Beaven Rake,⁴²⁸ gives one of his able reports on leprosy, putting together the notes made on 109 autopsies of the disease, which throw additional light on the various pathological changes observed in connection with the disease.

Blanc,⁶¹ in an admirable lecture on leprosy, gives some interesting statistics of the present prevalence of this disease. He says there are seventy-five to one hundred lepers in Louisiana alone, and gives interesting statistics from various other parts of the world. Blanc tells us that the bacillus lepræ can be cultivated. Montgomery⁷⁷ reports the case of an American, said never to have been out of the United States, who died of leprosy in the San Francisco Pest-House, February 17, 1890. The patient's history, however, is not without suspicion, from the character of the individual and the difficulty of eliciting any facts regarding himself. A curious suspicion has been cast upon the famous "Dublin leprosy case" of Hawtrey Benson. Creighton⁶ has suggested that

it was a case of yaws, but several able observers, some of whom had seen the case, have scouted the idea (see Hillis⁶, ^{1861, vi}). Beaven Rake⁶ gives a number of observations on fibrin in the blood of lepers. Daly²²⁴ gives a report of leprosy in Cuba. Woods²⁰ gives the treatment of leprosy at Honolulu. Hansen^{2011, 77} gives a valuable paper on the etiology of the disease. Other papers of note are those of Gronvold, ⁶ "Leprosy in Minnesota"; Thin, ⁶ "Leprosy in Spain"; and Gaucher, ⁸ on "Cretaceous Infiltration of the Nerves in Leprosy."

LUPUS.

Auto-Inoculation.—Unna^{4; 267} says that no one in the future will cherish the illusion that lupus can be completely cured by tuberculin, even at its earliest appearance; but advantage may be taken of the favorable action of this substance, only that the patient is to furnish his own tuberculin, so to speak. Unna, proceeding upon the view that the principal elements of tuberculin are to be found in the living bacillus or in the bacillus in process of devivification, has endeavored to bring the important elements of tuberculin into the circulation, if possible, without touching the living bacilli, and then to provoke absorption by physical means. He employs massage for this purpose, carefully avoiding the danger of rupturing the epidermic investment of the lupous tissue, and thus provoking internal resorption. He covers the part to be operated upon with an oxide-of-zinc plaster, operating upon a quarter-dollar-sized patch each day, by malaxy and *pétrissage*, with two to four fingers, for one to three minutes. When the surface is raw, he uses a creasote and salicylic-acid plaster, which gives more rapid results. In fourteen cases Unna obtained excellent results.

Lupus Tuberculosis Verrucosus.—Cognacq¹⁸⁸ reports the case of a man who, in 1881, perceived a wart on the right index finger, which he frequently cut off, hoping to cause it to disappear. The wart, at first the size of a ten-cent piece, gradually grew, until at the end of three years it covered the whole of the finger. Repeated cauterizations were ineffectual, and the mass became papillomatous. Finally, it was removed by scraping, but gradually returned.

The patient gave no family history of tuberculosis, nor had he

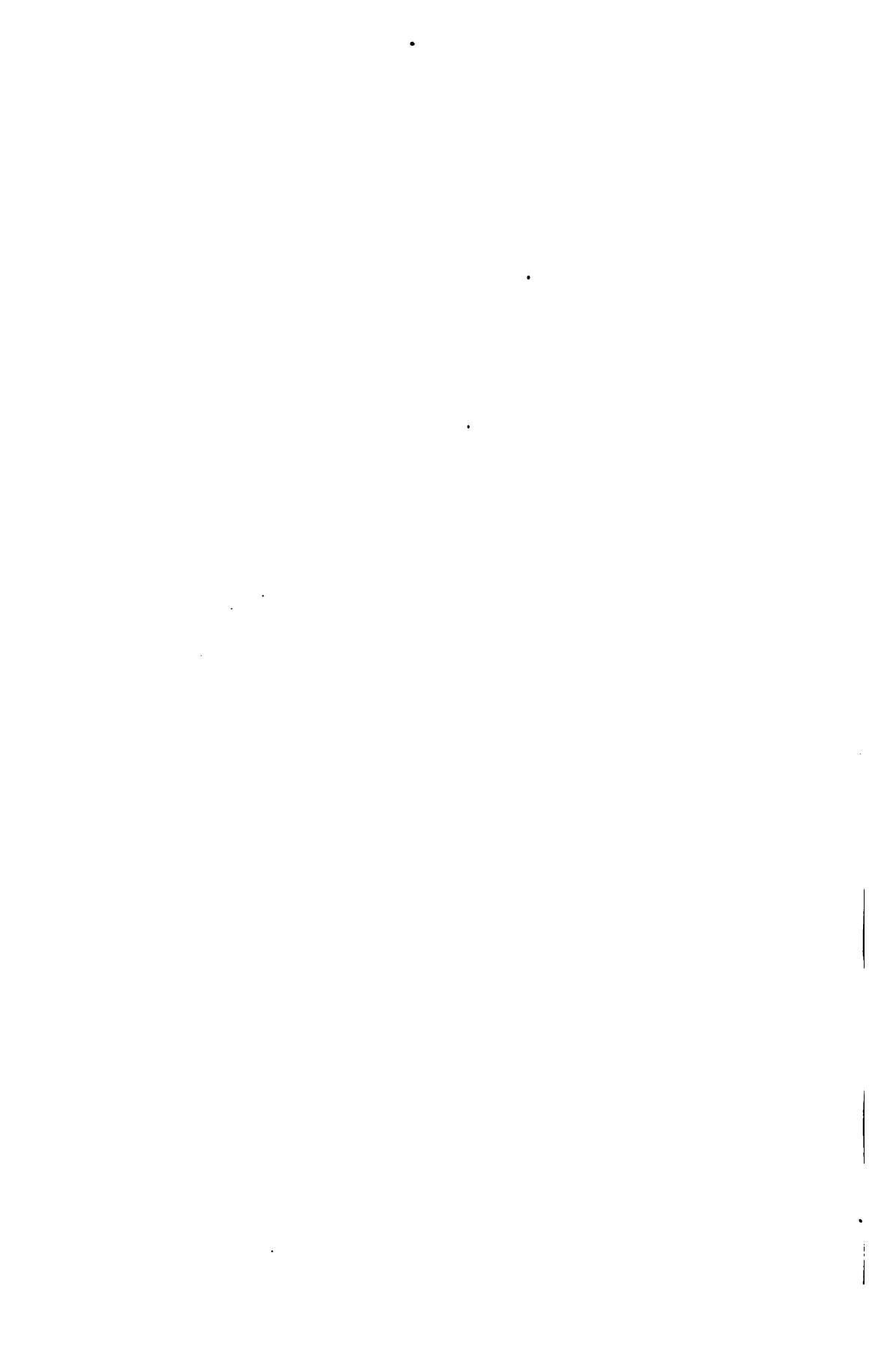
been exposed to contagion, excepting, possibly, in laying out the dead, which he practiced occasionally. At the time the case was reported (February, 1892) large, horny, warty patches could be seen on the dorsal surface of the right thumb and across the line of the metacarpo-phalangeal articulations of all the fingers, with various other similar patches here and there on the backs of the fingers. The forearm and arm were œdematos, presenting an elephantiasic appearance. The forearm was red, and covered with a number of small red veruccæ, pinhead to cherry size, rather of a blood-red than a warty appearance. Other warty growths could be seen encircling the wrist and over both aspects of the arm and forearm.

Each elevated patch, irregular on its surface, was formed of a great number of warty vegetations, hard and horny, and of a gray color, seeming like a firm, thick crust. In the interstices of these warts erosions and fissures could be seen, which bled upon pressure; in some places drops of blood exuded. The patches were surrounded by a red, inflamed, violaceous border, around which were found small crusts, pustules, and scales. The color of this border disappeared upon pressure, and all around the skin was quite smooth. A poultice applied to these patches, and then removed, showed a red, rugous surface, with fleshy vegetations; there was no pruritus. Examination of the thorax showed a slight dullness at the right pulmonary apex. The glands of the right axilla were enlarged. The treatment recommended was bandaging, to remove the œdema, followed by thorough scraping.

[In a somewhat similar case occurring many years ago, under care of Duhring, at the University of Pennsylvania, which was also under my observation, scraping was followed by excellent results.—A. V. H.]

Broca,⁸ considers scraping, though not permanently curative, an excellent treatment in extensive cases of lupus.

Diagnosis and Treatment of Lupus.—Corlett,⁹ in a paper read before the surgical section of the American Medical Association, gives a succinct account of the diagnosis and treatment of the disease. This accomplished dermatologist could scarcely have found a better field for his missionary efforts. The blunders made by some surgeons of this country a year or two ago, when they took advantage of their clinical facilities to appropriate all the





Lymphangioma-Lupus Lymphaticus (Hutchinson).
Archives of Surgery.

supposed and genuine lupous cases to be found for experiments with tuberculin, were of a nature to make angels weep. Now that the *furore* has passed, it may be advantageous for some of those individuals to take a few lessons in dermatology, so as to know cases of lupus when they encounter them. Moty²³⁷ gives the case of a patient suffering from lupus tuberculosis of the face, who was unsuccessfully treated by various means, but in whom much improvement was gained by hypodermatic injections of "eugenol" (a solution of iodoform in oil of sweet almonds), followed by applications of gauze saturated with the same, alternating with starch poultices. The strength of the solution is not mentioned; it may have been a saturated one. The amount was $\frac{1}{2}$, increased to $\frac{1}{4}$, of a Pravaz syringeful, probably once a day for a month, injected into the arm or leg. Thiersch²⁴ describes the *modus operandi* in the treatment of lupus by extirpation followed by skin-grafting. Gifford¹⁰⁸ urges the employment of tuberculin following excision, and gives illustrative cases. Roushine⁶⁷³ (report of Carl Szadek, corresponding editor) recommends the subcutaneous injection of a 1-per-cent. solution of chloride of gold or a similar solution of the cyanide of potassium, the dose being $\frac{1}{1000}$ to $\frac{1}{100}$ grain (0.000064 to 0.00064 gramme) of the former and $\frac{1}{1000}$ to $\frac{1}{100}$ grain (0.000064 to 0.00032 gramme) of the latter.

Haslund⁶⁷³ (report of J. Levison, corresponding editor) has treated thirteen cases of lupus by injections of tuberculin, without obtaining a single cure. As complications, there were observed intense pains in the muscles and bones, sometimes accompanied by swelling in the joints, parotitis, in three cases albuminuria, and very often an erythematous eruption. Bonandrini²⁰¹²;² has shown, by histological examination, that chrysarobin produces amelioration in lupus by converting the characteristic soft granulation tissue into a more nearly normal connective tissue, and suggests that it would be advantageous, before using the galvano- and thermo-cauteries and other similar measures, to prepare the parts by a preliminary course of treatment with chrysarobin.

LYMPHANGIOMA.

Under the name "lupus lymphaticus," Hutchinson⁸⁰⁸ describes a case, of which we reproduce the portrait.

The patient, a lady of 18 years, in good health, had suffered

from early childhood with something resembling a nævus vasculosus. After an operation, the scar of which can be seen in the picture, the growth of little lymph-“warts,” some of which were already present, was greatly increased, apparently by infection and the spread of satellites. The so-called “warts” were vesicles with firm walls containing lymph-fluid; near them, and sometimes on them, were numerous little tufts of dilated capillaries. Some of these were brown and some others were black. They could not be emptied of blood by pressure.

Anatomically, the growths are composed of dilated capillaries and lymph-spaces. Clinically, it is an infective and serpiginous malady, and very prone to attacks of erysipelas. It is curable only by extirpation.

Török,²² in a paper on the capillary lymphangiomata of the skin and the relationship of lymphangioma capillare varicosum to angiokeratoma, refers to the division made by Noyes and himself of the lymphangiomata. They include three classes: (1) the varicose lymphangiomata; (2) the tuberous or fibromatous lymphangiomata; (3) the cavernous lymphangiomata.

In the first class are included the classical cases of Hutchinson, Tilbury Fox, Colcott Fox, Köbner, Morris, Noyes-Török, Crocker, Walsham, Hayes, Schmidt, Smet, and Boeck. The second class contains the *lymphangioma tuberosum multiplex* of Kaposi, which is now generally regarded as identical with the *hydadenoma* of Jacquet, Lesser, Beneke, Philippson, and Besnier. In the third category are placed the cases of Van Harlingen and Pospelow, in which the tumors vary from the size of a pin's head to that of a pigeon's egg. They are of a bluish-violet color, and feel to the touch like an air-cushion; when incised, a cloudy, gelatinous fluid exudes. Their microscopical appearances are those of a cavernous angioma.

Lymphangioma Circumscripum.—M. B. Hartzell,^{9,10} reports the case of a boy of 15 years, who had suffered from early infancy with an affection of the skin, displayed in the form of a half-palm-sized patch of flat, irregularly-shaped vesicles, of pin-head to split-pea size, arranged in small groups of six to eight lesions. Some lesions contained minute tufts of capillaries, giving them a reddish hue. The lesions remained unchanged for months, and then disappeared by absorption,—new ones appearing to take

their places. The contents of the vesicles were clear, yellowish serum. There were no subjective symptoms and no pain on pressure. During the past year, the whole patch of the eruption had slowly moved from its original seat in the scapular region up to the summit of the shoulder, leaving slight atrophy, with faint pigmentation. Hartzell adds brief notes of a number of previously-reported cases of this rare affection. Microscopical examination in some of these cases revealed dilatation and rupture of lymph-channels, with, in some instances, a hyperplastic process leading to the formation of new lymph-vessels. The treatment consisted in thorough destruction of the lesions by caustics.

MADURA FOOT.

A parasitic affection of the foot, analogous to "madura foot," is described by Gemy and H. Vincent.²⁸⁷ Two cases have been noted by these observers, both occurring in Algiers. Only one is at present reported. The case was that of an Arab laborer, who had suffered from small tumors, gradually increasing in number, on the plantar surface of the right foot, from eight to ten years. Shortly before his entrance to the hospital these had become so painful as to prevent his working.

On examination, about forty dusky-red, pea-sized tumors—some firm, and others softer and even fluctuating; mostly isolated, but occasionally coalescing—could be seen, confined to the plantar surface and sides of the right foot.

None could be seen on the dorsum of the foot or above the malleoli, but the foot and ankle were slightly swollen and the muscles of the leg were atrophied. The tumors were exquisitely sensitive. When the foot and leg were exposed to the air, the foot (alone) sweated to a marked degree. When cut into, one of the bullous tumors gave out a serous discharge containing a number of corpuscles. It subsequently dried up spontaneously.

Microscopical and bacteriological examination of the serous discharge gave negative results; but the gray corpuscles proved to be bacterial zoögleæ, dense masses of filaments only showing their structure at the margin.

The organism proved to be *cladothrix*, recently shown to belong rather to the mucedines (*fungi*) than to the bacteria, and to come under the general *oospora* of Walroth.

Experiment shows it to be different from the other varieties of *cladothrix*, such as the microbe of farcy and the actinomycoses. [Cf. "Actinomycosis" in this report, where the opposite view is taken.—ED.]

While resembling madura foot closely, the disease above described differs from it clinically in not showing any fistulæ, in not attacking the bones, and in showing no black granules in the serous discharge. During fourteen months that the patient was under observation no appreciable change took place in the condition of the foot. Some tumors disappeared, while new ones took their place.

Amputation seemed to be the only effective therapeutic measure in this case, since excision of individual tumors was promptly followed by the appearance of new ones in the neighborhood. The constantly-increasing pain in the part seemed to make it likely that this procedure would soon have to be undertaken.

MEDICINAL ERUPTIONS.

Antipyrin Causing a Pemphigoid Eruption.—Petrini²⁸⁷ refers to a case reported by Veiel,⁴⁵ in which the administration of antipyrin was followed by violent pruritus of the lips, the palms and soles, the feet, and the glans penis, succeeded by œdema of the lips, with bullæ as large as haricot-beans, and other bullæ between the toes and on the palatine vault. There were also round, pruriginous, erythematous patches on the palms and the soles.

Petrini adds a case of his own, where the administration of antipyrin, and afterward of analgesin, was followed by a generalized eruption of bullæ from about half an inch to two inches in diameter, surrounded by a red areola with numerous erythematous patches, accompanied by quite marked pruritus. All parts of the surface, as well as the buccal mucous membrane, were involved.

These cases appear to have resembled erythema multiforme, with a marked tendency to the formation of bullæ. The eruption healed rapidly upon the withdrawal of the antipyrin.

Asparagus.—Lewin²⁸⁷ reports the case of a young doctor who showed purpuric patches over the forehead and eyelids whenever he ate large quantities of asparagus.

Atropia.—Wallace¹¹² reports a case where a drop of atropia solution introduced into the eye, to correct astigmatism, produced an erysipelatous inflammation of the eyelids and face.

Copaiba.—Tresilian²,_{May 14} reports a case where a patient, suffering from gonorrhœa, took six capsules containing copaiba daily for a week. At the end of that time he suffered from rigors and occipital headache, and next day had a temperature of 101° F. (38.33° C.); the following day a rash resembling erythema multiforme appeared, first on the backs of the hands, and later on the face, neck, and irregularly distributed over the rest of the body and limbs. The temperature rose to 103° F. (39.44° C.), but the pulse remained normal; no subjective symptoms, excepting headache on the first two or three days and a slight itching. After five days the eruption subsided, leaving dark stains, like those of purpura.

Iodine.—Lemoine³¹,_{May 14} gives a carefully reported case of iodic purpura, with references to the scanty literature of the subject.

MILIARIA.

Holsten¹⁵⁷,_{July} gives a contribution to this subject, under the title "Some Suppurative Conditions of the Skin Following Prickly Heat," in which he calls attention to the various pustular eruptions—impetigo contagiosa, paronychia, furuncles, etc.—accompanying and following the eruption of lichen tropicus or miliaria in certain cases, especially among the children of the poor. These eruptions are due to the implantation of pyogenic organisms, and the treatment should be directed accordingly. Thorough cleanliness must be insisted upon, the clothing must be boiled, and sublimate washes or ointments must be used. In some cases the crusts of the lesions may be removed and peroxide of hydrogen applied. This should be repeated daily for several days, antiseptic ointments being applied between times. The peroxide of hydrogen may be injected into the boils. Carabolic acid, aristol, europhen, resorcin, etc., or a lotion of ichthylol (2- to 5-per-cent.) made with a saturated solution of boric acid may be employed.

Joseph Coats,²¹³,_{July} under the title "Sudamina," gives a good description of the pathology of the affection.

Miliary Fever.—Draschke and Weichselbaum⁶⁵⁰,_{May 15} report an epidemic of miliaria, accompanied by fever,—a sort of sweating sickness, evidently infectious.

MOLLUSCUM.

Molluscum Contagiosum.—Pick ⁴⁵_{May 10} gives an excellent plea for the contagious character of this disease, based on successful inoculations. Other contributions to our knowledge of this disease are by Ritsch, ²⁴_{July 10} Pilliet and Mauclaire, ⁷_{Aug. 11} and Shaw. ²⁹_{May 12}

MYCOSIS FUNGOIDES.

Philipsson ²⁶⁷_{June 12} concludes an extended article on the histology of this subject by the following statements: 1. Mycosis fungoides originates in the connective-tissue cells, and must therefore be classed among the granulomata. 2. The eczemaform period is, anatomically, already the beginning of the granuloma; the so-called eczematous patches are a thin and extended granuloma. 3. The biopsy of these patches in an ambiguous case can alone decide the diagnosis, because their histological structure is characteristic.

At the Société de Dermatologie et de Syphiligraphie, when Philippson's paper was read, Darier and Gaucher took exception to these conclusions, in terms too technical to transcribe in this report, but to which reference should be made by those interested in the subject. Hallopeau and Jeanselme ³_{Dec. 10, '11} describe the erythrodermic form of mycosis fungoides. Stelwagon and Hatch ²⁴⁵_{Jan. Feb.} describe two cases of this disease, with careful histological examination. Accompanying is a chromo-lithograph giving the clinical appearances.

NÆVUS.

Nævus Verrucosus.—Hagen ³⁴_{May 10} publishes an interesting article on unilateral verrucous nævus. Similar forms of nævus, but not unilateral, are pictured by Hutchinson. ⁸⁰⁸

Nævus and Epithelioma.—An article by Renoul ²¹²_{Aug. 10} shows that both vascular and pigmentary nævi not unfrequently serve as the starting-point for malignant growths, usually epitheliomata, but occasionally sarcomata.

Spider Nævus.—Under the name "Spider Nævus," Hutchinson ⁸⁰⁶_{July} gives some interesting facts about these small angioma found about the face in young persons. They are easily destroyed by a drop of nitric acid applied in the centre with a sharp stick.



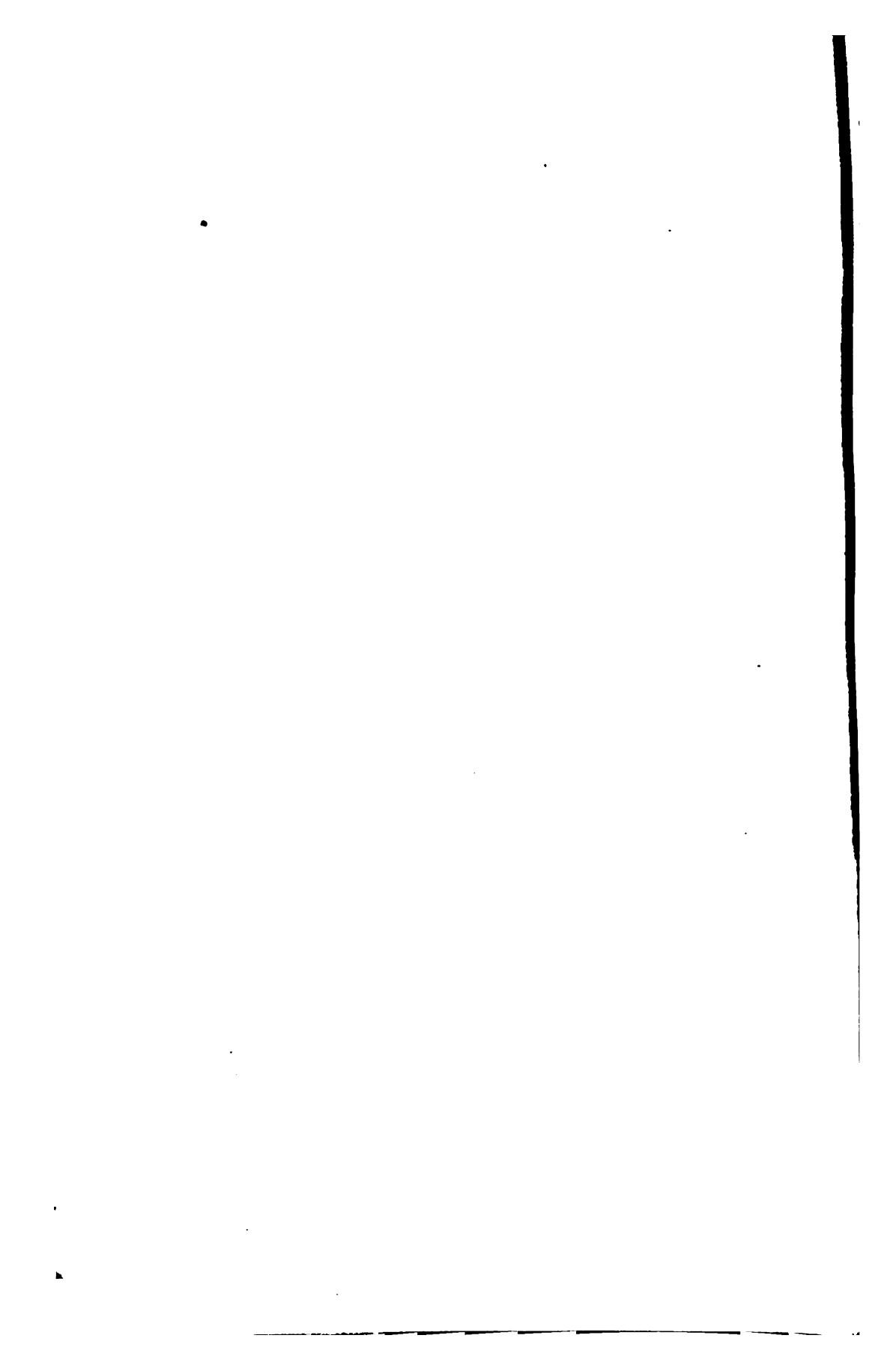
Case I



Case 2

Mycosis Fungoides. (Stelwagon)

Journal of Cutaneous and Genito-Urinary Diseases



NAILS, DISEASES OF.

Onychia and Paronychia.—Hutchinson⁸⁰⁶ gives a case of multiple syphilitic onychia. The circumstance is rare, and what is peculiar to this case is that the initial lesion of the disease was periungual. Our corresponding editor, J. Levison,⁶⁷³ reports a case of Brümische's where a neglected paronychia gave rise to chills, followed by a purpuric eruption, pain and swelling in the joints, bloody diarrhoea, transitory heart-symptoms, and haematuria, which persisted some months. He thinks there was an invasion of microbes from the paronychia, from which endocarditis ulcerosa, and embolism of the affected organs resulted. Standler⁸⁶⁴, gives the case of an adult woman who shed the nails of hands and feet annually.

NEUROMA.

Multiple, Painful Neuroma.—Camelot²²⁰ reports the case of a man of 30 years who complained of pains in the plantar aspect of the left foot. Twelve years previously, after a blow received upon the left leg, he had noticed a pea-sized tumor above the inner malleolus, which was painful upon pressure; two years later, a similar tumor on the right leg above the external malleolus, also painful on pressure.

Within the last two or three years spontaneous neuralgic pains had gradually developed in the sole of the left foot. These were at first intermittent, but later they became almost continuous. Once or twice neuralgic pains had occurred on the dorsal aspect of the right foot.

On examination, one of the little tumors was found painful, the other not so, but with a painful point under it. Both were movable. A third pea-sized tumor was found in the sixth right intercostal space. The tumors were found, on operating, to be imbedded in nerves, from which they were dissected without interfering with the nerve-function. No examination was made.

ŒDEMA OF THE SKIN.

Blue Hysterical Œdema Simulating Raynaud's Disease.—Thibierge²⁸⁷ reported to the Société de Dermatologie et de Syphiligraphie the case of a man of 28 years, already reported in various journals for his general condition, who showed a marked tumefaction on the back of the left hand and fingers, yielding to pressure,

and of a color varying in places from red to violaceous or bluish. The surface was smooth and shining, and much cooler than normal.

The condition had occurred previously, and then disappeared entirely, to recur later. This point, together with the unilateral character of the affection, the superficial character of the lesions, and a contraction of the flexors of the hand, differentiates the disease from the various forms of asphyxia of the extremities, and from those trophic disturbances noted in connection with syringomyelitis or sclero-dactylitis.

The hysterical character of the patient's general condition had been amply demonstrated ⁴⁵² in previous descriptions of his case.

Papers on localized œdema by Bauke ⁴ and Allen Starr ¹ may also be noted.

PEMPHIGUS.

Pemphigus Foliaceus, with Generalized Papillomatosis.—Quinquaud ²⁸⁷ reports the case of a woman of 37 years, suffering from amenorrhœa, a general puffiness, with subicteric tint, dark urine, trembling of the œdematos eyelids, burning pains in the stomach, and alternate anorexia and voracity.

The eruption began as a single, tense bulla on the cheek; new lesions quickly followed until, by the end of eight days, the entire surface, excepting the palms and soles, were covered with the eruption, which was accompanied by extreme pruritus. The bullæ ruptured spontaneously, leaving the skin raw and moist. No new bullæ came out after the eighth day, but the serous discharge from the bullæ became so profuse that the bed-linen had to be changed twice a day, and this discharge lasted for a year.

After five or six months the desquamation, at first slight, became profuse and general, and lasted two years in a foliaceous form, to become after that time purpuraceous and only slight in degree.

In January, 1892, the patient, who was then 46 years of age, and had had the disease nine years, had been in the hospital for six months. She showed partial alopecia, with scaliness over the scalp. The face was covered with lamellar scales and quadrilater fissures. The scales were adherent at the centre and free at the periphery. A papillomatous condition had begun to show itself about the upper and lower lips, in the form of an exaggeration in the natural folds of the skin, and by the myriads of horny granu-

lations in a state of desquamation. A similar condition could be observed in the cervical region, while about the shoulders, scapular region, and down the back, the granular keratosic condition was markedly developed. On the thoracic region this papillomatous aspect was not well marked, but it was more noticeable over the abdomen. A similar condition could be observed on the limbs. The nails were deformed. They had been shed several times in the course of the disease, and regenerated to a partial degree. The patient's general condition had improved while in the hospital, but her digestive functions were far from being well performed. Her appetite was poor; she vomited from time to time; she suffered with almost continuous diarrhoea (two or three stools daily), with some colic, frequent eructation; slow, difficult digestion.

To sum up, Quinquaud called attention (1) to the prodromal stage, in which there was renal insufficiency, with œdema; (2) to the bullous stage, of an ephemeral character; (3) to the long period of exfoliation, lasting more than two years; (4) to the phase of general papillomatosis; (5) finally, the general benignity of the disease.

[We are at a period of revision, as regards the pemphigus group of skin diseases, and it is difficult at present to define this affection. It cannot be denied, however, that an affection—a true pemphigus—exists, causing galloping cachexia, lowering the nutrition, with a relatively brief evolution. It can be seen that such an affection is different from that above described, but how far this difference extends Quinquaud could not say. He intended pushing the investigation of the case reported farther, and intended to report again later.—ED.]

PITYRIASIS RUBRA.

Pityriasis Rubra and Tuberculosis.—Jadassohn,¹⁵ p. 91, vi; pp. 65, 271, 300 in an exhaustive series of articles on pityriasis rubra, says that several writers on the subject have remarked that many patients dying of pityriasis rubra have also had tuberculosis, or have even succumbed to tuberculous affections. He has found some few bacilli in the enlarged glands,—often observed in connection with this disease,—but concludes that, although of eighteen cases of pityriasis rubra eight certainly had tuberculosis and one or two seemed to show signs of the latter affection, a close connection between the two diseases cannot be positively affirmed.

PURPURA.

Purpura of Infectious Character.—Lannois and Courmont⁴⁵⁷ report the case of a man, 23 years of age, suffering with purpura, with fever (39.8° C.— 103.6° F.), and showing enlarged submaxillary ganglia below the left jaw, which multiplied, and were followed by the appearance of other less enlarged ganglia in the groins and axillæ. The patient died shortly after. Examination of the blood, taken before and after death, showed organisms which, after culture, produced erysipelas in rabbits. The organism proved to be streptococcus pyogenes, and the affection was, therefore, an infectious disease, characterized by generalized ganglionic hypertrophy and hæmophilia, with purpura, and due to the streptococcus pyogenes. J. H. Musser²⁰¹⁸ describes some of the grave forms of purpura hæmorrhagica, with illustrative cases.

Purpura Hæmorrhagica, Examination of the Blood in.—Spiétschka^{46: 287} found that the red corpuscles of normal blood rarely contain nuclei. In two cases of purpura hæmorrhagica Spiétschka found invariably a large number, even after abundant hæmorrhages. A long series of hæmorrhages of the skin, accompanied by bloody urine, caused a diminution in the number of red corpuscles in the blood and of hæmoglobin. But these soon reappeared in their former proportion.

The researches of Löwit, Müller, and others show that young blood-corpuscles contain nuclei, and that their multiplication takes place by indirect division or karyokinesis, the nucleus disappearing later. It seems likely, therefore, that the appearance of nuclei in the red blood-corpuscles is connected with the regeneration of the blood. The hypothesis, that it is a pathological alteration of the red blood-corpuscles or of products of the decomposition of these corpuscles which, producing pathological modifications of the blood itself, is also the cause of alterations in the capillary walls and resulting hæmorrhages, is therefore unlikely. Such a modification of the blood leading to hæmorrhages should take place before or simultaneously, and not after some hæmorrhages have already occurred and when regeneration of the figured elements has occurred.

Rossi,^{506: 287} in the case of a patient dying of visceral cancer, who had presented purpuric spots three days before death, demonstrated the entire absence of extravasation of red blood-corpuscles and of sanguineous granular deposits outside of the blood-vessels.

This seems to show that the purpura of cancer cases is not a true haemorrhage, but simply a haemoglobinæmia; the passage of leucocytes and of haemoglobin through the vascular walls is rendered possible by an alteration in their parietes, resulting from the general state of denutrition of the tissues observed in such cases. This is the same cause which determines the haemoglobinæmia,—a virulent and living cause, which constitutes the primary and principal of the carcinosis, or represents an effect or transformation of the latter.

Kolb⁵⁰ examined five cases of purpura haemorrhagica, of which three terminated fatally. In the blood of living patients he could find no bacteria, while he found in the organs, three or four hours after death, a variety of bacterium characterized by motionless, oval rods (*bâtonnets*) with rounded ends, mostly diplobacilli connected together, and looking like transparent filaments. Cultures were inoculated on various animals, producing haemorrhages, and showing large numbers of the bacilli in the various organs after death.

RHINOSCLEROMA.

Rhinoscleroma, or Geroscleroma; the Relations Between its Bacillus and that of Erysipelas.—Ducrey²⁷ says that rhinoscleroma may originate in the nasal passages and throat, as well as at the edge of the nose; its bacillus differs from the streptococcus of erysipelas. He has proved that the streptococcus of erysipelas is so attenuated by the bacillus of rhinoscleroma as to be without effect when inoculated upon animals. He adheres to the name “geroscleroma,” given by Besnier, as less exclusive than rhinoscleroma.

SARCOMA.

Fibrosarcoma Cured by Erysipelas.—Langenbuch⁵¹ reports the case of a young man, in whom over one hundred tumors, from bean to hen-egg size, appeared over the body in the course of a few months. Examination under the microscope showed the tumors to be of a fibro-sarcomatous nature. One of them was extirpated. Erysipelas occurred in the wound, and spread over the whole body; in the course of which the entire collection of fibro-sarcomatous tumors disappeared, as if they had been blown away. After two years, only two tumors recurred, both small and easily exterminated.

Sarcoma Pigmentosum.—Abraham,² reports a case of pigmented sarcoma occurring in the face, chest, etc.

SCLERODERMA.

Hoffa³⁴ reports a case of scleroderma involving a long, narrow strip of skin on the inside of the thigh, which was extirpated by the knife and examined microscopically.

The epidermis appeared of normal thickness; the stratum corneum was composed of a few layers of flattened cells, and contrasted in volume with the stratum Malpighii. The papillæ were mostly normal; a few seemed elongated. The appendages of the skin, hair, and glands appeared normal, but their connective-tissue envelope showed extensive small-cell infiltration. A similar condition was observed in the sheaths of the subpapillary blood-vessels.

The corium consisted, in both upper and lower strata, of loose connective tissue, the individual fibrillæ of which appeared distinctly divided in their sections. The elastic fibres seemed normal. The veins and capillaries showed nothing abnormal; but the arteries showed abundant infiltration with round-cells. In the adventitia the connective-tissue bundles were pressed apart by a circumscribed cell-growth. The media and intima were diffusely altered, showing the sclerodermic process to be essentially a perius- and endarteritis-fibrosa. This agrees with Dunkler's³²³ views.

Audry and Deslot²¹¹ report a case of scleroderma "*en plaques*," and make some remarks as regards the classification of this affection, adding a number of references to articles published in Lyons.

Jacquet and de Saint-Germain³ report lesions of the cord (*myélite cavitaire*) in a post-mortem of a case of scleroderma.

Brocq,³ reports a case of scleroderma apparently cured by electrolysis. He introduces fine needles obliquely, uses weak currents for short periods, and confines the operation to already-sclerosed patches. He thinks the effect general, and not confined to the immediate vicinity of the needle.

Brault²⁴⁸ reports a case of scleroderma in patches limited to the scalp. Other cases are reported by Bloom²²⁴ and Dunn,¹ in the negro. Robert²⁰⁰⁷;⁵⁵ describes the muscular changes occurring in connection with scleroderma. Eulenberg⁷⁵ has studied the electrical resistance offered by the skin in scleroderma.

Dinkler,⁴¹ gives a good abstract of our present views on the disease; but no new light has been thrown upon the subject by any communications which have come under our notice during the past year.

John Tascher¹⁹² reports a case of *scleroma neonatorum*.

SCABIES.

Besnier³, reports a case of scabies derived from the sarcoptes of the horse. The patient, a groom, was red from head to foot, and covered with a confluent miliary eruption, complicated by hyperidrosis and seborrhœic crusts on the hands, beard, nape of the neck, and eyebrows. The parasite was discovered in the crusts.

SYCOSIS.

Kromayer,¹¹⁶ starting with the principle that all cases of sycosis are parasitic and are propagated by auto-infection, attempts (1) to prevent epidermic auto-infection, and thus prevent the extension of the dermatosis and its recurrence; (2) to cure the already-existing foci of infection. Kromayer depilates and applies the following ointment:—

R. Acidi tannici,	. . . . .	Đij	(2.66 grammes).
Sulphuris precipitati,	. . . . .	Điv	(5.82 grammes).
Pulv. zinci oxidi,			
Pulv. amyli,	. . . . .	aa 3ij Đj	(9.88 grammes).
Vaselini,	. . . . .	3vj Đij	(27.66 grammes).—M.

He punctures, scarifies, and scrapes, with a view of reaching the parasite. To prevent spreading, he depilates and washes the surface with a 1-per-cent. solution of sublimate in alcohol.

STAPHYLOCOCCIA.

Under the title *staphylococca purulenta cutanea*, Wickham⁹⁷ includes various affections of somewhat different clinical aspect, but all caused by staphylococcus. Wickham says the progress of bacteriology has shown that suppuration may be produced by many different causes, the principal of which are: 1. Certain chemical substances without any microbial participation in the process, e.g., oil of turpentine injected into cellular tissue, etc. 2. Microbes of all sorts, e.g., the bacillus tuberculosis of Koch, which causes "cold abscesses"; the bacillus anthracis; the

virus of soft chancre; the streptococcus pyogenes; the staphylococci pyogenes aureus et albus, etc.

It would be of great advantage if the pathogenesis of the various kinds of pus found in diseases of the skin could be definitely determined. As a step in this direction, Wickham gives the result of his investigations on the action of the pathogenic staphylococci in skin diseases. He concludes that there is a dermatosis caused by these organisms which merits the title of staphylococcia here given. It presents diverse forms, according to the predominance of certain of its morbid elements. These forms are commonly known as furunculosis, impetigo, and certain folliculites. A number of other similar affections ought to be classed under a temporary group as "probable staphylococcia."

SYPHILIOIDS.

Syphiloids of Infancy — Pseudosyphilitic Folliculitis.—Bataille,²⁵⁷ at a meeting of the French Dermatological Association, says that a large number of infantile skin diseases are vaguely called erythema. These are various in appearance and little known as to their nature. Their habitual seat is about the buttocks and the posterior aspect of the thighs and legs. They are often mistaken for syphilitic affections. The lenticular syphiloid of Parrot has been shown by Sevestre and Jacquet to be really non-syphilitic, and they have given it the name of "post-eruptive syphiloid." Fournier has proposed the name of "pseudosyphilitic folliculitis." The following is an illustrative case: an infant, born of a syphilitic mother (twenty years after the initial lesion) who had had four abortions or dead-born children, was, at 1 month of age, feeble and weakly. It showed no enlarged ganglia in groin or neck; the eyes and ears were healthy; no coryza; no lesions of a suspicious character about the lips, tongue, or palate. The eruption appeared, a few days after birth, in the anogenital region, as a red spot. Similar patches could be seen on the feet and, a little later, on the thighs and hands. On examination, small, irregular, rose-colored spots could be seen upon the scalp, an eczematous redness behind the ears, slightly moist, with yellowish crusts. There were small miliary vesicles, white and transparent, on the forehead and cheeks, particularly numerous about the lips and chin. Elsewhere on the face were minute rose-colored

spots, some punctiform and of a deeper red, all isolated. On the arms the deep-red spots predominated, looking almost purpuric. They were more numerous upon the forearm, and were mixed with the rose-colored spots and vesicles.

The palms of the hands were of a uniform scarlatiniform red, not entirely disappearing under pressure. The backs of the hands were of normal color, but covered with vesicles, particularly in the interdigital spaces, while the ends of the fingers were desquamating. The chest, abdomen, and back were free of eruption. On the thighs, from the interfemoral crease to the coccyx, were small erosions, some isolated, others confluent, varying in size from a pinhead to that of a pea, roundish or polycyclic, of a vivid rose-red, surrounded by an erythematous areola, absolutely superficial, with a slight moisture exuding. A few were on the right lumbar region.

On the convex portion of the buttocks the lesions were in the form of deep erosions, and of a deeper red, slightly coppery, more numerous, and of a larger size,—from a lentil to a ten-cent piece; almost all coalescent, with polycyclic or geographical outline, with an abundant viscous discharge. Between these erosions the skin was red. The radiating folds of muco-cutaneous tegument about the anus were excoriated and covered with minute, deep excoriations, irregular in form and slightly moist. There were a few erosions on the perineum and lower portion of the labia majora; the external genitalia were otherwise nearly intact. There was an abundant discharge from the vulva. The feet were affected very much like the hands, but with considerable scaliness, especially about the toes, and several bullæ of considerable size.

Fournier said these cases were of great diagnostic importance. What should be done about having a wet-nurse? Unlike the cases of Parrot and Sevestre, the lesions here were disseminated over the face, etc. Without being syphilitic, might not this case be derived from syphilis?

Besnier said he had never seen eruptions of this character in true syphilitics.

Baltzer had had a similar case, which he had regarded at first as a syphilioid, but which, later, developed coryza and terminated fatally.

Jacquet said that the lesions in this case were different from

those which had been described by Parrot, Sevestre, and himself, which were confined to the posterior aspect of the buttocks, thighs, etc., and grouped by preference near the centre of these regions.

In Parrot's cases the lesion consists of an area of diffuse erythema, on which are scattered small, rapidly-excoriating vesicles, leaving the surface raw. This goes on *very rapidly* to the formation of pseudopapules (post-erosion syphilitoids), simulating closely a recent papular syphiloderm. This affection is quite unambiguous; it is *not* syphilitic, although it may occur in a syphilitic infant.

Quinquaud added his experience that these lesions, and also polymorphous, bullar, erythematous lesions of a simple character, may occur in syphilitic infants, rendering these cases extremely difficult of diagnosis, as well as extremely important from a medico-legal point of view.

Fournier added that in the limited (Sevestre-Jacquet) form he should not hesitate to commit the infant to a wet-nurse.

Jacquet replied that he had frequently done so without untoward result.

VITILIGO.

Vitiligo with Leukoplakia Buccalis.—Du Castel²⁷ reports the case of a patient, of markedly neurotic temperament, who had vitiligo from the age of 3 years. A few white hairs and some small groups of white hairs could be seen upon the scalp and beard. On the sternum were numerous normally-colored hairs, around which were well-marked, shining, white areola, of a millimetre radius.

The greater part of the dorsum of the tongue was the seat of a well-marked leuko-keratosis; the palatine vault and the gingival surface also showed numerous ivory-like patches, slightly elevated. Some of these had existed since the age of 12 years, and could not be attributed to smoking.

Kaposi,²⁸ says that vitiligo is often produced or occurs around a lentigo or nævus, and grows considerably with time.

Schiff²⁹ has obtained a durable cure in vitiligo by electrolysis.

THERAPEUTICS.

Antimony.—Douglas and Jamieson³⁰ report cases of psoriasis and eczema cured by the internal administration of minute doses of tartar emetic.

Antiseptic Treatment of the Tinea.—Busquet,²⁸⁷ after a series of experiments, has ascertained that the ethereal oils exercise a marked effect upon the development of microphytes. Recent clinical experience has confirmed his views, and he recommends the employment of Chinese oil of cinnamon, in the proportions of 1 part to 3 of sulphuric ether. Favus, tinea circinata, and, recently, the fungous form of alopecia areata have been rapidly removed by this application. He has seen alopecia areata cured in three to five weeks.

Héricourt⁷⁸ recommends essence of turpentine in tinea tonsurans and in tinea versicolor.

Camphorated Naphthol.—Reboul⁴⁷⁹ says that camphorated naphthol was discovered by Désequelle. It is a liquid, unctuous to the touch, colorless when first made, but taking on a light-brown color under the influence of light. It is obtained by mixing 10 parts of chemically pure naphthol- β and 20 parts of finely powdered camphor, heating gently and filtering. It should be preserved in yellow bottles, hermetically sealed.

Reboul has used this, interstitially injected, for the cure of scrofulo-tubercular glands. He aspirates the gland by a syringe with previously sterilized tube, if there is pus, and then injects 2 to 20 drops of the camphorated naphthol. The injection may be repeated every eighth day.

Chaulmoogra-Oil.—Oro²⁸⁷ gives chaulmoogra-oil in doses rising to 160 drops per diem, in tubercular and anæsthetic leprosy, with marked influence on the disease. The effect is to diminish notably the number of bacilli in the blood of infiltrated tissues. The utmost that can be claimed, however, thus far, is an arrest in the development of the disease.

Chrysarobin, its Pigmenting Effects on the Skin.—Campana⁴⁵ says it is well known that when chrysarobin is used in the cure of psoriasis the parts which were affected turn white, while the surrounding skin turns a yellowish red. Microscopical examination shows that the pigment in the surrounding skin is caused by the deposit of numerous blackish-yellow particles of chrysarobin within and between the epithelial cells. In the basic layer of the epidermis they are not found in the affected parts, because there the superficial layer of the epidermis does not exist. The absence of color in the psoriatic patches, therefore, depends on the

absence of that part of the epidermis to which granules of chrysarobin are deposited.

Dermatol.—Weismueller¹ thinks this new remedy of little value, but Rosenthal says that in certain cases of ulcer of the leg it produces a favorable and calmative action, diminishes the secretion, and causes rapid cicatrization. In other cases dermatol is not so successful.

Epidermin: a Substitute for Pastes and Ointments.—Kohn, of von Hebra's clinic,⁵⁷ describes under this name a mixture of pure bees' wax beaten up with water and glycerin, of a milky, semi-fluid character, drying by exposure to the air, so that when spread upon the skin it forms a soft, thin, adherent, elastic coating. When used as a vehicle for fluid medicaments, an equal quantity of an indifferent powder ("alumen plumosum") aids in the drying. The preparations should be kept in wide-mouthed, glass-stoppered vials. It requires some skill to prepare epidermin. In adding medicaments to it as a base, the drug should be first incorporated with glycerin,—10 per cent., Kohn says; but whether he means of the drug or of the epidermin a practical apothecary alone can ascertain. Epidermin is so mild and neutral a preparation that, in Kohn's opinion, it is superior to Lassar's paste, liquor gutta-perchæ, glycerin jellies, etc. Unfortunately, Kohn does not give the exact proportions of the ingredients of epidermin, nor of the technique of its manufacture. I suppose, however, that any intelligent pharmacist could work out a process.

Euphorin (Phenylurethan).—Peroni and Bovero^{73; 237} say that this new remedy may be employed in fine powder, in alcoholic solution of 10 to 50 per cent., in ointments of 10 to 20 per cent., or in soaps. It is insoluble in water. In the treatment of venereal ulcerations this preparation is superior to the powders ordinarily employed. It suppresses suppuration, removes bad odors, allays pain, and promotes cicatrization. In addition to its antiseptic character, euphorin has a certain degree of analgesic action, which makes it useful in painful rhagades, burns, and herpes zoster.

Europhen (Iodide of Cresol).—Nolda^{116; 237} says that iodide of cresol can be used to replace iodoform, being better than the latter as an application to ulcers and suppurative lesions. It is superior to iodoform in being odorless, non-toxic, and of five times lighter specific gravity, making it cheaper.

Gallacetophenone.—Goldenberg¹ recommends this substitute for pyrogallic acid, introduced by Rekowski,¹¹⁶ and known in commerce as "Alizarin yellow, C." It is prepared by treating pyrogallic acid with acetic acid in the presence of chloride of zinc. It is a yellowish powder, which readily crystallizes in yellowish needles; scarcely soluble in cold water, easily soluble in hot water, alcohol, ether, and glycerin.

Gallacetophenone is a pyrogallic acid, in which CH_3CO are substituted for H. It differs from pyrogallic acid in that it is oxidized in alkaline solutions so slowly that its reducing powers are much less. It is absolutely non-toxic. Gallacetophenone displays strong antiseptic qualities. Goldenberg has tried it, in 10-per-cent. strength, in a dozen cases of psoriasis, with result of a cure in two or three weeks, without pigmentation remaining. He has also used it with success in eczema seborrhœicum. The ointment stains the clothing slightly.

Linimentum exsiccans sterilizatum is the name given by Pick⁸⁸ to a mixture of 5 parts tragacanth, 2 parts glycerin, and 100 parts distilled water. It should be made warm. Various medicaments may be dissolved in it, and when painted on the skin it leaves a thin varnish.

Lobelia.—Ziegler,¹⁷⁶ in a commencing felon, wrapped the part in antiseptic cotton saturated with tincture of lobelia, renewing the applications four times daily. Within two days the felon was completely arrested.

Pilocarpine.—Simon² has used subcutaneous injections of pilocarpine with success in the treatment of senile pruritus and in the diffuse infiltration of chronic eczema. The dose employed was $\frac{1}{2}$ to $\frac{1}{4}$ grain (0.008 to 0.01 gramme) twice daily.

Pyoktanin.—Von Sehlen²⁸ injected pure pyoktanin into a large rodent ulcer of the face, which had resisted treatment before, and also applied it externally. The pain was excessive, but was alleviated by a solution of cocaine and antipyrin, and, by covering with ichthyol plaster and zinc paste, a cure resulted.

Sodium Cantharidate.—Müller^{116; 287} treated two cases of lupus and two of syphilis by means of this drug, in hypodermatic doses of 1 decigramme ($1\frac{1}{2}$ grains), and in infants, $\frac{1}{2}$ centigramme ($\frac{1}{2}$ grain). The injections were made in the interscapular region, and were followed by slight increase of temperature and pulse,

followed by a rubeola-like exanthem. The results were very satisfactory.

Soziodol Preparations.—Schwimmer⁸ uses the soziodololate of sodium in simple pustular diseases, in fissures, in burns, and instead of iodoform. An ointment of 40 grains (2.66 grammes) to 1 drachm (4 grammes), with $\frac{1}{2}$ ounce (15 grammes) each of liquid paraffin and lanolin, is convenient. Also, a powder of $\frac{1}{2}$ drachm to 1 drachm (2 to 4 grammes) with 1 ounce (30 grammes) of lycopodium.

Thilanin (Brown Sulphurated Lanolin).—Saalfeld²⁸⁷ revives, under this name, an old remedy, formerly known as balm of sulphur, or sulphur and linseed-oil. Thilanin is a combination of sulphur and lanolin; it is an unctuous preparation, nearly of the consistence of ordinary lanolin, of a brownish-yellow color, and the odor of sulphur. It is used as a mild application in superficial skin affections in succession to the more soothing remedies,—as ung. diachylon (Hebra), vaselin, and borated lanolin. Saalfeld has gotten good results in subacute eczema of various forms with this remedy.

Tumenol.—Neisser⁶⁹ feels obliged to apologize for the introduction of “another new remedy.” He has, however, employed tumenol for two years past in public and private practice, and feels warranted in lauding its virtues, chiefly as an antipruritic in eczema.

The two preparations employed—*tumenolsulphon* and *tumenolsulphonic acid*—are derivatives of petroleum, the chemical nature of which and the method of preparation are given in Neisser’s paper. They are both contained in the by-product, *tumenol*,—a substance resembling ichthyol, but different. Tumenolsulphon is of oily consistence, and is commonly known as tumenol-oil. The acid is a powder, commonly called tumenol-powder. They possess a dark color and slightly disagreeable odor. Tumenol-powder is soluble in water, while tumenol-oil is insoluble.

The mother-substance, tumenol, makes a clear solution in a mixture of equal parts of ether, alcohol, and water (or glycerin), tumenol being added in the proportion of 10 per cent. The watery mixture dries readily on the skin; the glycerin mixture leaves a thin, soft layer, which easily takes up a powder dusted over it.

The powder is too coarse-grained, unless specially prepared, to

make a good ointment; the other two preparations, however, mix well with an ointment base.

The conditions in which Neisser has employed tumenol and its derivatives are the following: 1. Moist, not excessively acute, eczema, when rapid drying and skinning over are produced; also, burns of the first and second grades. 2. To prevent or allay hyperæmia and exudation. 3. In infiltrations. Here the effect of tumenol is not sufficient in penetration. 4. To allay itching in all forms of skin disease. Its effect is most happy in eczema, parasitic dermatitis, prurigo, and pruritus, and particularly in rhagades, and in eczema about the anus and scrotum. In shallow ulcers where there is not much suppuration, in bites and wounds, and in the dermatitis accompanying the presence of animal parasites tumenol is very useful. Its effects are particularly happy in the impetigo of scabies.

Tumenol has no antiparasitic influence. It appears to be entirely non-toxic to the system at large.

In acute relapsing eczema of the hands, Neisser uses moist compresses of a 2- to 5-per-cent. watery solution of tumenol-powder.

The preparation most frequently employed by Neisser was a 5- to 10-per-cent. paste of tumenol-powder (with or without the addition of powdered oxide of zinc) and starch, or of tumenol-oil and zinc paste. Sometimes these pastes, or the tumenol itself, were made into an ointment with vaselin or anhydrous, soft lanolin.

These preparations were of high value in drying and skinning over the raw surface in two cases of severe pemphigus. The following thin compound ointment has given Neisser great satisfaction:—

K. Tumenol,	. . . . .	3iiss-v (10-20 grammes).
Pulv. zinci oxidi,		
Bismuth. subnitrat.,	. . . . .	aa 3iiss (10 grammes).
Ung. simplicis,	. . . . .	3vj (180 grammes).—M.

[The latter ingredient was softened by being composed of "ung. lenient," 50 per cent.]

While the tumenol-paste is most convenient in moist eczema, etc., the tincture is most suitable in dry, scaly conditions, and also in the multiple erosions following scabies.

The tumenol-oil can be painted on moist and vesicular eczematous surfaces, undiluted, and with rapid effect.

The finely-powdered tumenolsulphonic acid may be used on ulcerated surfaces, preferably over a thin smear of simple ointment, or it may be mixed with oxide-of-zinc powder for use in moist eczema.

OPHTHALMOLOGY.

By CHARLES A. OLIVER, A.M., M.D.,

ASSISTED BY

WM. CAMPBELL POSEY, A.B., M.D.,

PHILADELPHIA.

SECTION I.

CONGENITAL ANOMALIES, EMBRYOLOGY, AND HISTOLOGICAL ANATOMY.

L. Ferguson, of Otago, N. Z.,⁷⁶ reports two cases of *microphthalmos*. The first was that of a woman 42 years of age, who, twelve years previously, had had an iridectomy performed on the left eye for glaucoma. The refraction of the right eye was + 27. D. Two and one-half years later with + S. 18. D. vision equaled $\frac{6}{60}$. Both corneaæ measured 10 millimetres in their horizontal diameters. The second instance was that of a child 27 months old, whose corneaæ measured less than 9 millimetres. The irides were bound down to opaque lenses. Iridectomy was done on both eyes, followed, five years later, by a needling of the right lens. Later, a capsulotomy was performed on the left lens. The resulting vision in the right eye equaled finger-counting at 3 metres; in the left eye, finger-counting at 2.25 metres. Both optic nerves were much atrophied. In a case of unilateral microphthalmos with partial ankyloblepharon, in a negro infant, seen by Oliver, of Philadelphia,^{1018 July} careful dissection revealed a small, irregular, white eyeball without trace of corneal tissue. A case of double congenital *anophthalmos*, in an imperfectly-developed child of 9 years, has been seen by Hilbert.³⁵³ The orbital cavities were the seat of a chronic conjunctivitis. There was not the slightest trace of either globes or optic nerves. The author cites an instance of congenital maculae of the cornea which were associated with anterior capsular cataract.

Zirm,⁸ of Vienna, has seen a concentric form of bilateral congenital *leucoma*, around the middle of the pupil; near the upper and lower border of the cornea there were two gray, sickle-shaped

opacities. Weinbaum, of Göttingen,⁸⁵⁸ reports three cases of congenital anomalies of the borders of the pupil, which he believes may be regarded as a species of congenital *uveal ectropion*.

Hess, of Leipzig,³⁵³ reports a case of double congenital *iris coloboma*, about 3 millimetres wide, extending inward and upward. After cataract operations on both eyes, choroidal colobomata were discovered, which were directed downward. The author suggests that the coloboma of the choroid may have been due to the fact that the embryonic connective tissue, representing the future vitreous and capsule of the lens failed to disappear, thus offering an obstacle to the proper closing of the optic vesicle; whilst the normal development of the iris was disturbed by a late absorption of the vascular capsule of the lens on the inner upper portion of the lenticular margin.

Landesberg, of Breslau,³⁵³ reports a case of congenital *aphakia* and a secondary cataract in a man 38 years old. The patient had had poor sight since childhood, and for twenty years had worn + S. 8. D. There was a family history of eye disorders. With his correcting lens, vision in the right eye was $\frac{5}{7}$. In the left it was $\frac{5}{6}$, only when the correction was placed 6 centimetres from the eyes. With + S. 15. D. the vision equaled but $\frac{4}{6}$, but with + S. 4. D. at 18 centimetres vision equaled $\frac{5}{2}$. He explains these phenomena by the fact that the patient wore the lens of + S. 8. D. at 6 centimetres distance with the same result as would be obtained by an emmetrope in using the combined lenses of an opera-glass.

Eiseck³⁵³ reports a case of *lenticonus posterior*, with posterior polar cataract. He believes the condition to be congenital, as the patient, who was 36 years old, had had poor vision in the affected eye from an early age. Mitvalsky, of Prague,¹⁹⁰ has seen a case of congenital *lenticonus posterior*, associated with a partial persistence of the arteria hyloidea, in a child 8 years old.

Friebis, of Philadelphia,⁶¹ observed a case of double *congenital dislocation of the lens* in a boy 7 years of age, who was also partially amblyopic. The lens in each eye was tilted upward, slightly backward and inward. No other structural changes could be detected. The author concludes "(1) that congenital ectopia lentis is usually double; (2) that it is a congenital malformation, the cause of which is not yet positively established; (3) that amblyopia and ametropia are always concomitant conditions,

and that the majority of cases, so far reported, sustain the theory of heredity as the primary cause."

Zirm, of Vienna,⁸ reports two instances of ectopia lentis in two sisters, each of whom had anomalies of the osseous system. A case of binocular *coloboma of the choroid and iris* associated with double internal strabismus and lateral nystagmus has been seen by Barrett, of Victoria.²⁸⁵ Talko³⁵³ reports a case of *coloboma of the optic nerve*, in a boy 5 years old, which was complicated by a round, dark, and smooth projection from the ciliary process. The author considers the latter appearance to be due to an hypertrophy of a ciliary process, a so-called congenital melanoma.

Murrell¹⁰⁰⁷ reports, as a "unique" *anomaly of retinal veins*,

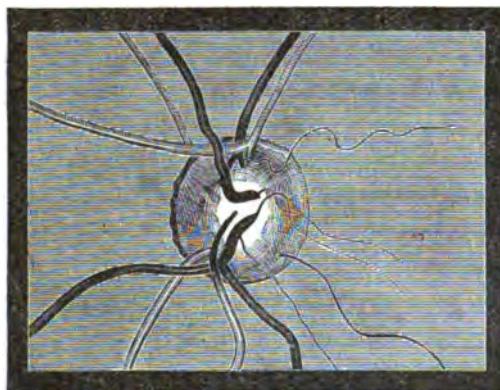


FIG. 1.
ANOMALIES OF THE RETINAL VEINS.
(*London Lancet.*)

an instance in which one of the principal retinal veins completely encircled the corresponding artery within the area of the optic disc. Judging from his own and other cases, Stephenson⁶ thinks it possible to make the following provisional classification of congenital anomalies of the retinal veins: (1) cases in which two of the primary veins are united by a cross-branch, or in which a branch connects a central with an aberrant vein (*vide* Figs. 2 and 3); (2) cases in which a vein bifurcates on its way to the centre of the disc (Fig. 1); (3) cases in which a venous anastomosis is formed upon the disc itself (Figs. 3 and 4).

Ferron⁷⁰ cites an instance in which the most careful search failed to reveal the existence of the lachrymal canaliculi in an

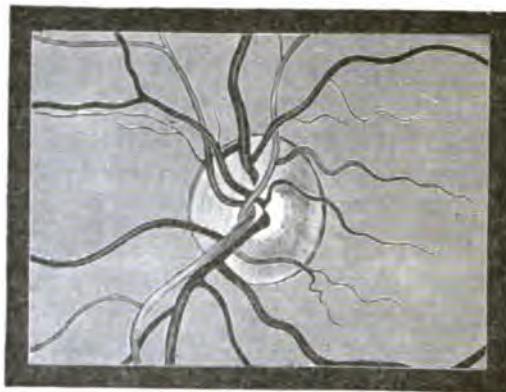


FIG. 2.

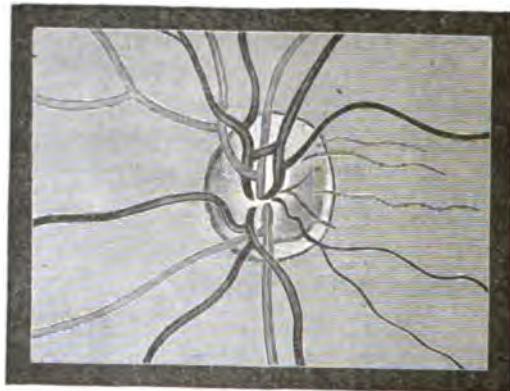


FIG. 3.

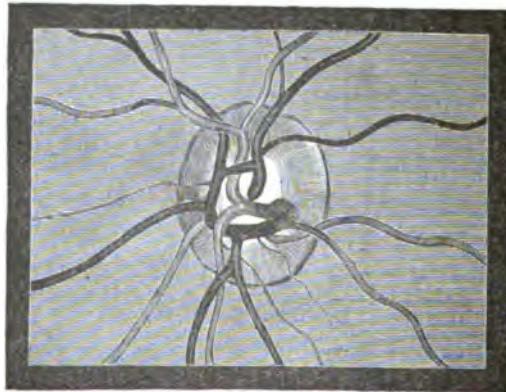


FIG. 4.
ANOMALIES OF THE RETINAL VEINS.
(*London Lancet.*)

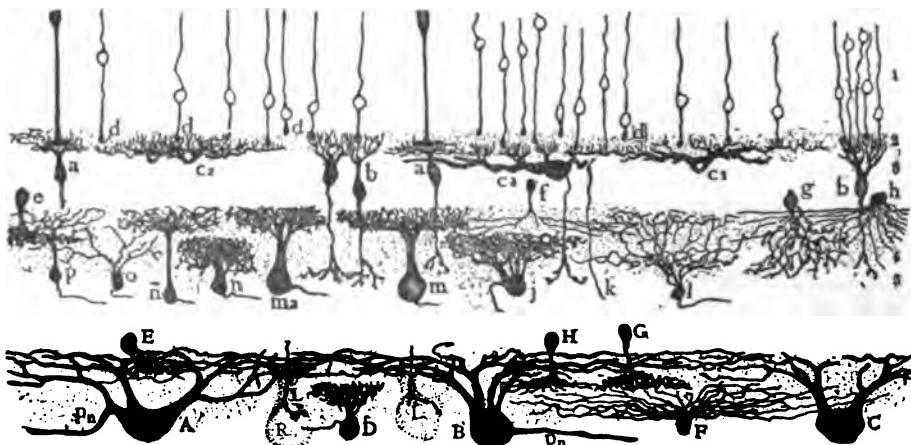
adult. The patient had always suffered from dryness of the nasal chambers. O. Bull, of Christiania,^{249 July} has seen another case of *synchronous movements of the upper lid and lower jaw* in a man with left congenital ptosis. The lid was involuntarily elevated during opening of the mouth, as in speech and mastication, and while bending the head backward with the mouth closed. Voluntary elevation of the lids was possible if the fellow-eye was covered. The author rejects the hypothesis of an abnormal innervation, and suggests that the movements are associated or reflex. Hirschberg, of Berlin,^{190 Sept.} reports a case of *congenital bilateral ptosis* in a boy 7 years old. Whenever the eyes were directed upward tremulous movements occurred, which ceased when the organs were lowered.

Cheney, of Boston,^{50 Nov. 7, 1911} reports an instance of retraction of the eyeball in a woman 27 years of age. The case was evidently one of *congenital ophthalmoplegia externa*, in which the right eye was unusually retracted when an attempt was made at strong inward rotation. This retraction he attributes to the combined and simultaneous action of the superior and inferior recti muscles in attempting to supplement that of the internus, which was very defective. Fryer, of Kansas City,^{1018 Apr.} has seen a case of congenital bilateral external ophthalmoplegia and congenital bilateral facial paralysis in a boy 16 years of age. Although the vertical movements of the eyeball were incomplete and lateral conjugate movements were impossible, convergence occurred when an object was carried inward along the median line. Both eyes were highly myopic and epicanthus was present. The right hand was wanting and the whole right upper limb was of less length and girth than that of its fellow. The author suggests that an absence of the sixth nucleus and a partial absence of the seventh might account for these conditions.

Stuart²⁷ describes a ring-like net-work of fibrous-looking tissue in the ciliary region of the vitreous humor of the normal eye. The dominant lines of the net-work were attached to the "bounding" membrane of the vitreous, just in front of the anterior margin of the true retina, and extended backward and inward, toward the axis of the eyeball, into the vitreous substance. The author has mechanically isolated the ring from the human eye.

The accompanying sketch is a representation of the *minute anatomy of the retina*, and illustrates the result of a careful study

made by Cajal ¹⁸⁸¹ upon that membrane in some of the mammalia. In the figure, the fibres of the cones are seen to be thick and straight, and to be provided with terminal filaments, which enosculate with those coming from the bipolar cells. The fibres of the rods, on the other hand, are fine and flexible and terminate inferiorly in an ellipsoid corpuscle (d, d). The author found that the terminal spheres of the rods were not all in the same plane, but that they formed a granular band which occupied the deepest portion of the external granular layer. Projecting from the small subreticular cells, the author has seen numerous fine, short fila-



DISPOSITION OF RETINAL ELEMENTS.

Elements of the retina of dog, stained with the chromate of silver. 1. external granular layer; 2. external reticular; 3. internal granular; 4. internal reticular; 5. ganglionic; a. bipolar cell of rod; b. bipolar cell of small rod; c1 and c2. small subreticular layer; c3. large subreticular; d. small sphere of a rod; e. median spongioblast; f. fine spongioblast; g. spongioblast of granular arborcence; h. quadrilateral spongioblast; i, j, m, n, f, o, p. varieties of median and small ganglionic cells. A, B, C, giant ganglionic cells; D, F, two types of small ganglionic cells; L, interior termination of bipolar cells.

(*Gaceta Sanitaria de Barcelona.*)

ments which ended in a fine nodosity, and occupied the place between the small spheres of the rods (c1, c2). He further believes that the small subreticular cells have the power of bringing in association a considerable number of the small rods.

The accompanying two plates represent the anatomical structure of the nerve-fibre layer of the human retina, as given by Dodiel, of Tomsk, ²⁹ July 14, and depict more particularly the distribution of the fibres about the optic disc and the macula. The author found the fibres to be composed of axis-cylinders of varying thickness, consisting of nerve-fibrillæ and an interfibrillary substance. These cylinders are grouped into bundles of considerable thickness

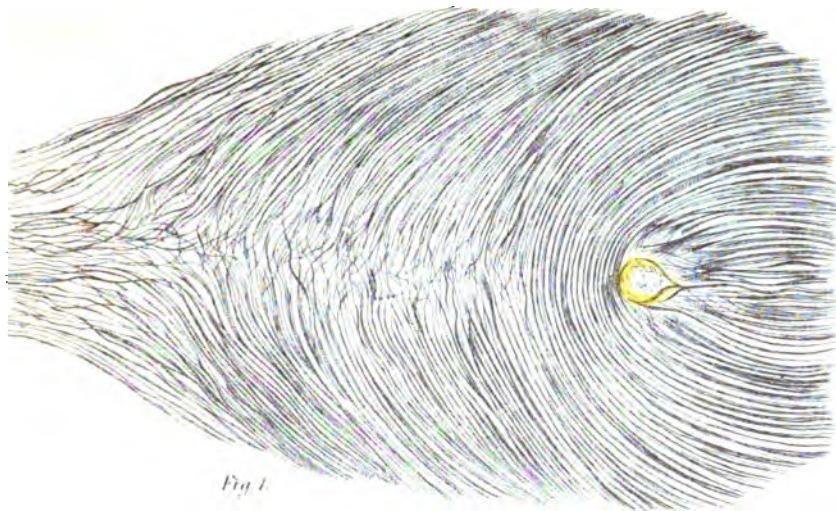


Fig. 1.

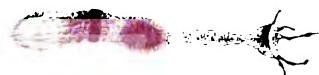


Fig. 3.

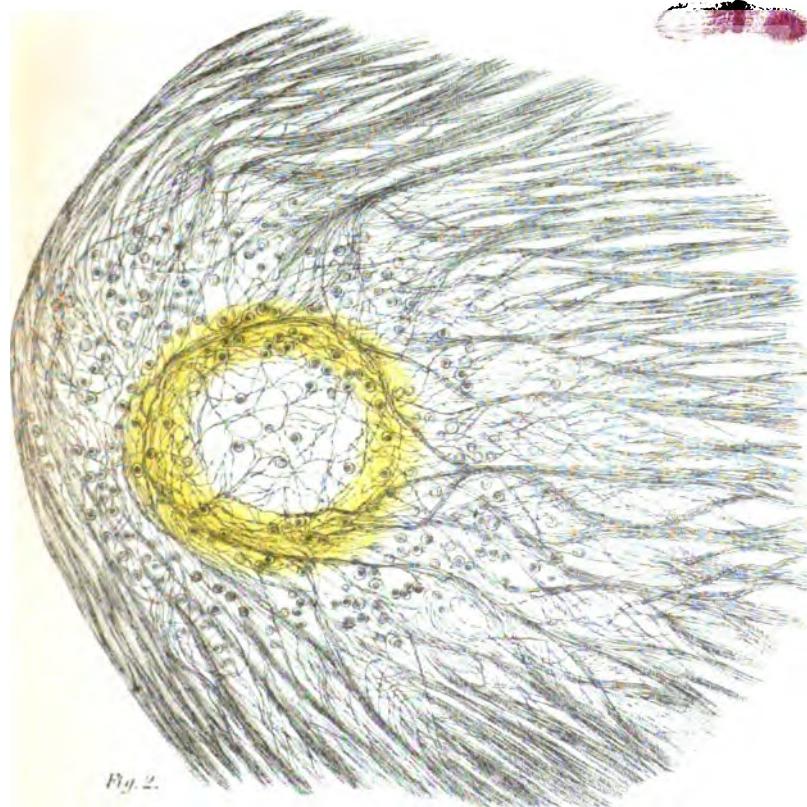


Fig. 2.

The human retina.(Dogiel).

Archiv für Mikroskop Anatomie



about the optic nerve, but become thinner as they approach the ora serrata, single cylinders leaving the bundle to terminate in one of the ganglia cells. There are from twenty-five to thirty bundles going to the macula; those of Michel (c) proceed directly to it, whilst others (d) curve around it, forming a bow. As these bundles approach the macula, they divide into their constituent fibrillæ and form plexuses. Some of the fibres can be traced to the fovea centralis, where they form a ring (Fig. 2). From this ring still finer bundles and single fibrillæ find their way to the bottom of the fovea. Fig. 3 represents several varicose threads which he found on the ends of the cones, and which he traced to the outer retinal layer.

Musgrove, of Edinburgh,²⁷⁷ describes a method by which the whole of the injected retina can be prepared for exhibition with the lantern. From a study of the retinæ of oxen, prepared after this plan, it appears that this membrane is permeated, throughout its whole extent, by a dense capillary plexus. The author is satisfied that no anastomosis takes place between the vessels of the retina and those of any other part of the eye, unless it be with the choroidal vessels in the neighborhood of the disc.

In order to examine the *ciliary circle*, Galezowski, of Paris,¹⁷⁸ employs a weak convex lens joined to a very strong achromatic prism. The author states that in myopia, as in hypermetropia, in syphilitic and gouty choroiditis, and in sympathetic ophthalmia, disease of the vitreous is invariably accompanied by an alteration in the ciliary circle which is appreciable with the ophthalmoscope. He concludes as follows: 1. The ophthalmoscopic examination of the ora serrata is indispensable in all constitutional maladies. 2. In syphilis, hereditary or acquired; in interstitial keratitis or parenchymatous choroiditis, the lesion of the ciliary circle is characteristic of that affection. 3. In the tabetic atrophy of the papilla there are often found choroidal atrophies of the ora serrata, due to syphilis. 4. In certain forms of optic neuritis or perineuritis the ciliary circle is also involved, this being an indication of the specific nature of the disease. Elschnig, of Gratz,²⁵⁴ describes very minutely the pathological anatomy of an eye in which there was an *embolus of the central artery* of the retina. The principal conditions found were thrombosis of the left internal carotid and of the sinus cavernosa, caused by atheroma. The lumina of the

ophthalmic artery and of the central artery of the retina to its division in the papilla were free; in both of the papillary arteries there was an embolus which did not completely occlude their calibre. The walls of the retinal arteries showed varying degrees of chronic inflammation, particularly of the intima, whilst the smaller vessels were completely occluded. The innermost layers of the retina were highly atrophied, principally around the lateral border of the papilla, while the outer ones were in general well preserved. The macular area was changed into a thin membrane, composed almost exclusively of young proliferating connective tissue, containing the remains of the outer molecular layer. The rods and cones of that region had also disappeared, whilst the pigment was very irregular. The optic disc was atrophied, the nerve-elements being replaced by connective tissue. The nerve itself was also degenerated, in a gradually diminishing degree, centripetally.

SECTION II.

PHYSIOLOGY.

By means of a suitable contrivance, Tscherning¹⁸¹ has observed a *new entoptic phenomenon*, consisting of a crown of light and a number of rods composed of alternate light and dark bars, radiating from a luminous disc of light which had been thrown on the retina from the apparatus, a circle of the same grayish color as the lighter rods surrounding the disc. The observer advances the hypothesis that the lighter rods are due to rays passing through the iris at points where they are not completely cut off by the ciliary processes, while the latter form the darker rods. Tscherning¹⁸² has formulated a theory upon the formation of the *spots of Purkinjé*, and also upon the causation of a new image of objects formed on the retina by rays which impinge upon it only after they have been repeatedly refracted and reflected by the media of the eye. From experiments made to ascertain the laws governing the *persistence of retinal impressions*, Charpentier¹⁸³ concludes that, for the constant phase of this persistence, its length varies inversely as the square root of the intensity of the stimulating light, and inversely, too, as the square root of the duration of stimulation; whilst for the total persistence or the period of decreasing persistence, added to the period of constant

persistence, it was found to vary directly in proportion to the intensity and length of the stimulus. The author calls attention to the longer degree of persistence of objects focused upon the central portion of the retina, in comparison with those objects falling upon the periphery.

Having investigated the *action of the ultra-violet rays* of light upon the eye, Widmark, of Stockholm,⁶⁹ _{Aug. 28} concludes that they directly irritate the anterior media, causing injection, chemosis, and catarrh of the conjunctiva, keratitis, contraction of the pupils, and alterations in the iris. He has also demonstrated that the lens possesses great absorptive powers for these rays, and becomes clouded after exposure to them. The author thinks that, if this absorption did not occur, the rays would probably cause serious lesions of the retina. He believes that blindness following a flash of lightning (Blitzstarr) is explained by the fact that lightning is rich in ultra-violet rays. As a result of experimentation, Vitzow, of Bucharest,³ _{Sept.} states that the visual centres of dogs are situated in the occipital lobe. He has also found that extirpation of the posterior portions of the cerebrum leads to total permanent blindness.

From ophthalmometric *measurements of the cornea* of forty-one eyes, Burnett, of Washington,⁸⁴⁷ _{Aug.} demonstrates that the cornea gradually diminishes in curvature from the point of visual axis toward the periphery, and that this diminution is much greater on the nasal side, both in emmetropia and ametropia, the average curvature being equal to 2. D. less at 15 degrees on the nasal side and 5. D. on the temporal side. The practical inference drawn by the author is that the place of election for an iridectomy should be on the temporal side.

Tscherning⁸² has found, by means of the ophthalmophakometer, that at the end of accommodation the lens suffers a downward displacement, in order that the eye may become properly centred. Schleich¹⁸³ _{Aug. 16} has described the refraction and the fundi of different vertebrates. Although the length of the visual axis greatly varied, there was more or less hypermetropia, except in fishes. Sous¹⁸⁸ _{Jan. 21} gives new formulæ and illustrations of the relation of age to accommodation, differing somewhat from those of Donders. Bravais¹⁷¹ _{Dec. 21} says that, in reading, the eye moves by jerks, and that the movements cannot be less than an angle of

5 minutes; so that when the angle becomes smaller, upon increasing the distance of the object from the eye, the organ soon grows tired of making the shortest possible movements. He gives this as an explanation of certain cases of muscular asthenopia.

In an article upon the *action of the oblique muscles*, Février¹⁷¹ accepts in the main the views previously held, but draws particular attention to the function of the superior oblique of projecting the globe forward and rotating it outward in looking inward and downward. This forward projection and adduction of the globe, associated with a compressing action which the two obliques also exert, he believes to be the main factors in the causation of myopia, and of its attendants, posterior staphyloma and retinal detachment. The author suggests that these conditions might find their cure in a measured tenotomy of these muscles. A diminution in the angle gamma and the muscular phenomena associated with miners' nystagmus may also, he thinks, be attributed to the action of these muscles.

For testing the latent position of the eyes in distant and near fixation, Straub⁷⁹ has recourse to a mirror so employed that the patient is enabled to accommodate his eyes for various distances, whilst the surgeon is near enough to measure these and to make the usual tests for squint. The instrument may also be used for the determination of monocular amblyopia, and its use is particularly recommended to army surgeons who have to do with the detection of cases of simulation.

Assuming that the thinning of the cortex found in Laura Bridgman's brain was caused by an arrest of development, Donaldson, of Worcester,²⁸⁸ V.A.N.D. has endeavored to determine the extent of the *cortical visual area* in man, and states, as a result of his study, that this area includes the cuneus and the angular gyrus, but does not pass on to the ventral surface.

In a most valuable contribution entitled "Further Experiments upon the *Lymph-streams and Lymph-channels of the Eye*," Gifford, of Omaha,²⁴⁰ gives the following summary: "1. The ferrocyanide and fluorescein methods are not calculated to give trustworthy results in determining the physiological currents of the eye. Many of the blue lines obtained by the former method represent simply the boundaries between tissue into which the ferrocyanide has diffused and that containing none. The lines

upon which most stress has been laid can be obtained perfectly well in the dead eye. 2. The view of Stilling, that there is no outlet from the vitreous forward around the lens, is incorrect. The zonula is freely permeable for solid particles, free pigment being carried regularly from the vitreous into the anterior chamber. The failure of the attempts to inject the anterior chamber from the vitreous is probably due to the closure of the chamber-angle, from the increased vitreous tension. It is probable that the fluid secreted by the ciliary processes posterior to the zonula divides into two portions, one part passing forward into the posterior chamber and thence through the pupil into the anterior chamber, the other passing back through the vitreous and out through the central canal of the opticus into the tissues of the orbit. 3. There is no evidence of any current passing from the posterior chamber through the iris-root. Pigment-bearing leucocytes may pass into the latter from either posterior or anterior chambers; much more readily, however, from the latter, from which they sometimes pass clear through the iris into the posterior chamber. The blue line in the iris-root obtained by the ferrocyanide method can be obtained perfectly well in the dead eye. 4. There is no evidence of any current from the anterior chamber through the membrane of Descemet into the cornea. Pigment-particles from the aqueous are taken up by the protoplasm of Descemet's epithelial cells, not so much by the cement-substance between them. Experiments on both dead and living animals show a free connection for non-diffusible substances between Fontana's spaces and the circumcorneal veins. It is therefore probable that the greater part of the aqueous leaves the eye in this way. Other finer lymph-channels lead from Fontana's spaces into the posterior layers of the cornea, into the perivascular spaces of the sclerocorneal junction (possibly), into the sclera, choroid, and perichoroidal space. Wherever these channels communicate with spaces in which there is a lower pressure than that within the anterior chamber, they must, on the whole, serve to some extent as outlets. This also applies to the perichoroidal space, which, besides being connected with the intervaginal space, communicates with the space of Tenon by numerous lymph-channels surrounding the vessels and nerves which pierce the sclera. The rare cases in which Deutschmann and myself have observed a passage from the intervaginal

to the perichoroidal space were probably due to exceptional causes. If there is any regular current here, it is more probably from the perichoroidal to the intervaginal space. In these finer channels apparently free pigment seems to pass indifferently in any direction. 5. Between the retinal pigment-epithelium and the layer of rods and cones is a tolerably well defined space, from which pigment passes freely into the retina, but hardly, or not at all, into the choroid proper, except along occasional penetrating blood-vessels in the neighborhood of the optic nerve. 6. While certain facts, such as the regular passage of pigment and bacilli from Fontana's spaces into the cornea, and the progress of subconjunctival haemorrhages in the same direction, together with the impermeability of Descemet's membrane from behind, speak for the nourishment of the cornea from its periphery, the corneal lymph-stream, if any exists, is too weak to perceptibly affect the diffusion of fluorescein or the progress of pigment-particles through its tissues."

Treacher Collins, of London,⁷⁶ has made an examination of nine *eyes that contained metallic bodies* which had remained *in situ* for periods varying from fourteen to twenty-eight years. In five of the cases the occurrence of pain was the cause for the removal of the eye, while in one the onset of sympathetic ophthalmia fifteen years after the receipt of the injury necessitated enucleation. The author found that where the substance had become imbedded in structures either destitute or scantily supplied with nerves and vessels, it was likely to cause less irritation than when situated in other parts. Bone-tissue was found in three eyes. In one instance it formed a narrow, twisted band, stretching from the position of the ora serrata on one side of the globe to that on the other, and passing across the spot where the foreign body was found imbedded in the sclerotic. Microscopical examination of the band of bone showed that there was a gap in the elastic lamina of the choroid beneath it and that part of the osseous mass projected into the gap, some of it being situated in the capillary layer of the choroid. The author explains this condition by supposing that the blow and entrance of the foreign body had produced partial rupture of the choroid, and that the bone had developed in the plastic exudation thrown out along it. A detailed description of the pathological conditions present in every case is appended.

Randolph, of Baltimore,²⁴⁹ has made some cultures with material from the vitreous and anterior chamber of an eye which had been enucleated owing to *sympathetic ophthalmia* excited in the fellow-eye. He was unable to demonstrate the appearance of growth upon the culture medium. A portion of the iris introduced into the anterior chamber of a rabbit's eye remained there quite innocuous for two weeks' time. The author regards this experiment as strong proof against the views set forth by Deutschmann.

Story, of Dublin,⁷⁶ claims that the experiments of Davis, of New York (See ANNUAL of 1892, vol. iv, B-7) merely show that blood-columns have the power of refracting transmitted light. He claims that the tube should not be placed in air, but in some medium with a refractive index nearly equal to that of the tubes and their contained fluid, and finds that in experiments conducted in this manner the only reflex resembling that obtained from retinal vessels is the reflex from the anterior walls of the tubes. From this experiment, and from an analysis of the various experiments performed to prove the numerous theories advanced, the author concludes that the reflection comes from the walls of the vessels. In answer to this, Davis⁷⁶ states that he has met with these objections experimentally, and finds that the same phenomena are to be observed as in the original experiments. In order to photograph the *human fundus oculi*, Gerloff, of Göttingen,³⁵⁸ gets rid of the disturbing reflex upon the cornea, and brings a larger portion of the eye-ground within focus by employing a water-chamber with a plane-glass front. The bath is filled with a warm salt solution and placed before the eye. As sources of light, he employs the so-called "cirkon licht" or a Ney's magnesium lamp, whilst a laryngoscope serves him as a reflector. From the changes found in a case of unilateral optic-nerve atrophy, Williamson, of Manchester,⁴⁷ believes that the "optic-nerve fibres, on crossing at the chiasma, pass to the inferior surface of the opposite half. In the tracts it would appear that the uncrossed fibres take a central position; and that crossed fibres lie at the inner half of the inferior surface, and perhaps along the periphery at the outer half of the inferior surface and at the outer side of the tract."

Millée, of Paris,²⁴ presents an apparatus for the examina-

tion of the color-sense, which consists of a series of minute squares of color fastened upon a small sheet of folded canvas. Its advantages consist in its cheapness and portability. Snell, of Sheffield,² directs attention to the importance of testing each eye separately for color-vision. He records the case of a girl, 11 years of age, who sorted the wools, as a green-blind person would, with the left eye, but with the right eye or with both eyes together matched the colors in a normal manner. A second case is noted, in which a patient "appeared red-blind with the right eye and incompletely green-blind with the left."

A case of central color-defect, in which the patient, a young woman, gave no evidence of subnormal color-perception when tested with "wools," has been seen by McGillivray, of Dundee.² As the ordinary tests employed for the detection of color-blindness would fail to reveal a defect of this nature, the author suggests that either Donder's or Nettleship's apparatus be employed in addition. Mackay, of Edinburgh,² thinks that a true quantitative test of the color-sense "should be one in which the visual angle remains (in the first place at least) unchanged throughout the experiment, and that the variable factor should, so far as possible, be the illumination, not the distance." For this purpose the author employs the lantern apparatus devised by Donders and modified by Snellen. From two personal cases added to the three cases of Landolt, Querenghi, of Milan,¹⁷¹ concludes as follows regarding total achromatopsia: In the five cases there was considerable reduction in visual acuity, though rarely falling below one-tenth. In four of the cases nystagmus was present; three patients had intense photophobia, especially when exposed to a bright light; spectral and dark-red produced in all cases a sensation equal to black, the other colors being recognized as achromatic light, their intensity varying with the nature of the color and its degree of saturation. Further, after white, yellow gives the most intense sensation of light, and in the cases that presented on the red side a reduction in the perception of the spectrum (three cases) the band of greatest light was displaced toward the green, whilst the patients to whom the whole spectrum was light indicated the line of greatest clearness in the yellow.

Alfred Graefe⁵⁵ describes a modification of von Graefe's prism test for the detection of *simulated monocular blindness*. The

blind eye being bandaged, a prism with an acute-angled base is brought slowly, with its base upward, before the eye in such a way that a double image of a candle-flame is seen through it. The patient being convinced that monocular diplopia is possible, the supposed amblyopic eye is uncovered without the patient's knowledge, and, the prism being shifted so as to produce a single image, the persistence of the doubling proves the associated action of the supposed blind eye.

Kōmoto, of Japan, ²⁰⁰ describes the anatomical peculiarities in the eyelids of the Japanese, and states that this race is very liable to entropion, on account of the skin being less firmly connected with the subjacent tissues.

SECTION III.

ERRORS OF REFRACTION AND ACCOMMODATION.

Reynolds, of Louisville, ⁶¹ is strongly in favor of adopting the angle of refraction as the test of value of all lenses, and suggests that they be accordingly designated in minutes and degrees. The accompanying cuts from an article by Burnett, of Washington, ³⁴⁷ Nov., '61 on some peculiarities in the refraction by tilted lenses, graphically represented, give a representation of the forms of the focal area of a point of light the rays from which are refracted by a spherical lens of 10. D. in one special, tilted position. Fig. 1 shows the focus at 10 centimetres of a gas-jet, twenty feet away. Fig. 2 shows the focal area when the lens is rotated 35 degrees on its vertical axis, the screen remaining at right angles to the line of direction of the incident rays. Fig. 3 shows this area when the screen is placed at an obliquity of 35 degrees in a direction opposite to the inclination of the lens. Fig. 4 shows the focal area on the screen when it is at right angles to the direction of the incident pencil, but at 9 centimetres from the centre of the lens. Fig. 5 shows the form the focal area has at 8 centimetres. Fig. 6 shows the form the focal area has at 7 centimetres. (See page 16.)

Würdemann, of Milwaukee, ⁶¹ regards "that amount of corneal astigmatism as normal which is neutralized by a corresponding lenticular astigmatism of the opposite kind." He considers this to be equal to the difference between the total and the corneal measurements, and believes that it may be considered a corrective

FIG. 3.



FIG. 2.



FIG. 1.



FIG. 6.



FIG. 4.



FIG. 5. SOME PECULIARITIES IN THE REFRACTION BY TILTED LENSES.

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effort on the part of nature in neutralizing a certain amount of lenticular error.

Considering that eyes with the same form and with equal absolute vision have a very different vision for near objects, and wishing, if possible, to obtain some standard of what an amblyopic

eye should see at different distances, Becker, of Düsseldorf, ⁸⁵³ has made an elaborate study of one hundred cases of amblyopia. He divides the condition into three groups: (1) those dependent upon diminished perception capacity of the retina; (2) those due to opacities in the refracting media; (3) those due to great abnormalities of refraction. He found that the first had the poorest and the last the best relative acuity of vision. Kollock, ⁸⁴⁷ of Charleston, believes that the eye of a pure-blooded negro who cannot read is emmetropic, or slightly hyperopic, but never myopic; that among the educated pure bloods errors of refraction are becoming more frequent; and that in the mulatto ametropia was almost, if not quite, as common as among the whites. Roosa, ¹⁰¹⁸ of New York, believes that the moderately hypermetropic eye may be considered a normal one, and that astigmatism is more apt to be a troublesome factor in causing asthenopia than hypermetropia alone. Martin, of Bordeaux, ¹⁷¹ asserts that the ciliary muscle has the power to provoke corneal astigmatism, and cites two instances which he believes go to prove this statement. He thinks that the exciting cause is usually some point of irritation on the same side of the body as the more-marked astigmatism. By citing a case of marked inequality in the corneal meridians when there was complete external ophthalmoplegia, the author excludes the action of the extrinsic ocular muscles as a factor in the causation of astigmatism. As practical conclusions, he says that it is well to determine the corneal astigmatism in all ambulatory cases, and that it is necessary to bear in mind that recent cases of amblyopia, where there are no apparent lesions, may be accounted for by corneal astigmatism. The use of atropine, conjoined with appropriate internal remedies, he believes to be strongly indicated in such instances. From a study of the axis of astigmatic lenses, Claiborne, of New York, ¹, concludes that "catastrophism" does not exist in the axis of astigmatism.

In an examination of one thousand cases of astigmatism, Knapp, of New York, ⁸⁴⁷ found that the meridian of strongest refraction was symmetrically placed in both eyes in 84 per cent.; that in 60 per cent. the direction of this meridian was vertical; in 10 per cent., horizontal; and in 4.3 per cent., diagonal. He proposes a classification of the varieties of astigmatism based upon the direction of the strongest meridian, viz., vertical, horizontal, and

intermediate or oblique; the latter class being subdivided into nasally oblique (or simple nasal) and temporally oblique (or simple temporal). Reynolds, of Eau Claire, Wisconsin,¹⁹ thinks that rapid advancement in the education of the young and the habit of placing so much work on the black-board are frequent factors in the development of various nervous and mental disorders.

Batten, of London,²⁰ claims that there is sufficient evidence for considering myopia to be the result of constitutional disease. His own observations are briefly summarized as follows: In myopia there is an inherited tendency, associated with inherited constitutional disease; its commencement and increase are caused by general and local vascular congestion, and by general and local increase of blood-pressure; its commencement and increase are caused by some constitutional diseases; it is accompanied by a general tendency to haemorrhage (epistaxis, menorrhagia, etc.); the cardio-vascular disease is a product of artificial and civilized life; and the cardio-vascular system shows evidence of degeneration in high pulse-tension, vascular dilatation, tortuous arteries and the heart. To prevent the dangers resulting from long-continued eye-strain in school-children, Symons²¹ advises that "the visual acuity of every scholar should be tested at least once a year, and, in the event of his inability to pass this test, a form stating the fact, and requesting that the child's eyes should be attended to, be sent to the parents or guardians; that the department should make it compulsory upon every teacher to immediately inform the parents or guardians of any instance in which he notices signs of eye-fatigue amongst the scholars."

J. R. Wolfe, of Melbourne,²² protests strongly against the extraction of the crystalline lens in cases of high myopia, as the operation exposes seeing eyes to the risk of blindness. The notes of a case of myopia, where the vision was improved by the removal of a cartilaginous spur in the left nasal septum and the application of a pressure-bandage to the eyes at night, is reported by Bates, of New York,²³ who remarks that, "as a general rule, it may be stated that when cocaine, applied to the mucous membrane of the nose, produces temporary improvement in vision, removal of any abnormality, however slight at that point, will produce permanent improvement in the vision. The converse of this proposition is also true."

From an examination of the eyes of over seven thousand school-children, de Mets, of Antwerp,¹⁵³ found that 2.13 per cent. were myopic. Before the age of 10 years, 1.16 per cent. had myopia, 1.33 per cent. being boys, 0.99 per cent. girls. After the age of 10 years, 3.10 per cent. were myopes: 3.88 among girls and 2.37 among boys. In well-lighted schools, 1.63 per cent. of the scholars were found to be myopes, 1.74 per cent. being girls and 1.57 boys. In badly-lighted schools, 3.75 per cent. of the scholars were myopes; of these 4.83 per cent. were girls and 2.67 boys. He says that bad light and increasing age, with increased demands made upon the eyes by study, are powerful factors in the development and augmentation of myopia. Fukala, of Pilsen,²⁵⁴ believes that myopia of high degree is caused not only by the elongation of the optic axis, but also by an increased refractive power of the lens, amounting in general to one-half more than that in emmetropes. He suspects that in moderate degrees of myopia, also, the refracting power of the lens is increased, but to a less extent. The same author²⁵⁴ thinks that the improvement in the vision of myopes of high degree, resulting from aphakia, is due to the advancement of the second nodal point and the resulting increase in size of the retinal image; while strong correcting glasses bring the conjugate focus so near the retina that surrounding objects are projected to a distance and made to appear much smaller.

From the examination of the eyes of 1149 school-children, of whom 188 were Jews, S. Stephenson, of London,⁷⁶ deduces these conclusions: "1. That 10.63 per cent. of the total number of Jews were myopic. 2. That 1.97 of the Christians were myopic. In other words, that myopia was nearly five and a half times more frequent among the Jews than among the Christians. 3. That the percentage of frequency of myopia in the Jew boys was more than six times greater than in the Christian boys. 4. That the Jewesses had nearly three and a half times more myopia than the Christian girls. 5. That the Jews showed a larger percentage of myopes than the Jewesses, the percentage difference between the two classes being 3.63. 6. That the Christian boys had less myopia than the Christian girls, and that the percentage of difference between the two classes amounted only to 0.64." In 12 cases of myopia observed by Harlan, of Philadelphia,⁸⁴⁷ in which full and constant correction

of errors ranging from 4. to 16. D. had been worn for periods of from five to seventeen years, there was a slight increase in degree in 3 cases and a considerable increase (2.5 D.) in 1 case. The author believes that "complete correction of the optical defect, with full restoration of the normal relation between accommodation and convergence, is the ideal condition, and can usually be obtained in young subjects with fair acuteness of vision and full accommodative power." Jackson, of Philadelphia,²⁴⁷ gives the results observed in 29 cases of myopia in which "full corrections" had been worn for periods ranging from three to ten years. In but 3 instances was there any notable increase in the degree of myopia, these being in students between the ages of 12 and 21 years. Under full correction the ametropia in these cases subsequently became stationary. Sous¹⁸⁸ attributes many of the vicious attitudes in school-children to ocular anomalies, giving the observations of three illustrative cases. Caldwell²⁵⁷ believes that every general practitioner should be in a position to diagnose those ocular conditions which give rise to symptoms of asthenopia.

In an examination of three hundred and twenty *asthenopic eyes*, Risley, of Philadelphia,¹⁰¹⁸ has found 30 per cent. of simple hypermetropia, in 70 per cent. of which the degree was less than 2. D. The author considers that these results incidentally serve to show that we cannot disregard hypermetropia as a factor in producing asthenopia, even when the defect is much lower than 2.5 D. "His judgment is unhesitatingly in favor of full correcting glasses, so that the refraction of the dioptric system, which is then made to include the correcting glasses, shall approximate emmetropia." Theobald, of Baltimore,⁷⁰⁴ points out that subnormal accommodative power may be a not infrequent cause of asthenopia. He believes that it may occur independently of refractive errors, and that if the usual vertical diplopia test at twenty feet fails to show a difference in favor of the internal recti muscles, as compared with the test at thirteen inches, of at least 3 degrees, the weakest convex spherical glass which will give the minimum amount of normal exophoria (from 2 degrees to 3 degrees) is the one to be prescribed.

In an analysis of two hundred cases of refractive errors, Ellis, of Los Angeles,⁴⁴ found that in 60 per cent. of the patients, ex-

clusive of presbyopes, headache was a marked symptom ; and that in 15 per cent. of the remaining cases it was an occasional, but not a prominent, one. From a study of a series of cases, Bates, of New York,¹, concludes that (1) spasm of accommodation cannot always be relieved by atropine, and (2) that the vision of symptomatic myopia can often be improved so that glasses are unnecessary.

From a consideration of sixty consecutive cases of long-standing headache, Walton and Carter, of Boston,², conclude that “(1) a large proportion of cases of functional cephalalgia, and especially migraine, is due wholly or in part to eye-strain ; (2) good vision is not inconsistent with such a difficulty ; (3) when practicable, very slight errors of refraction should be corrected in cases of cephalalgia, as well as in others with functional nervous symptoms.” In a lengthy article, on some prevalent errors relating to *eye-strain as a cause of nervous derangements*, Ranney, of New York,³, makes the following summary: Errors of refraction should be studied under atropine, and muscular anomalies cannot be determined without a phorometer and the judicious use of prisms. The eyes while being tested should always be properly corrected by means of glasses ; and if Javal’s ophthalmometer be used, it should be employed only in conjunction with a pupil that has been dilated with atropine. The author further believes that the conditions that cause eye-strain are usually congenital, and are seldom the result of a debilitated physical state. Eye-strain is perhaps the most frequent factor in producing functional nervous diseases. He has never seen a case of typical sick-headache disassociated from eye-strain, latent hypermetropia and esophoria being the conditions generally present. Esophoria, hyperphoria, and hypermetropia are the most common ocular abnormalities found in the severer types of chronic nervous disturbances. The author believes that hypermetropia is much less frequently corrected than myopia, although it is the more important of the two in the production of nervous symptoms. A typical cross-eye does not, as a rule, cause serious nervous disturbance. The author finally draws attention to the fact that the accurate fitting of frames to the face of the patient is a factor too often overlooked in attempts to relieve eye-strain.

Edsall, of Pittsburgh,⁴, states that the majority of recurring

or persistent headaches are reflex in character, due to some abnormality in the refraction or to an imperfectly maintained muscular balance between the ocular muscles. Valk, of New York,¹ reports an instance of tonic spasm of accommodation, in a man aged 40 years, which had persisted for three and a half months, despite the continued use of a 4-grain (0.26 grammes) solution of atropine. The refraction error in each eye proved to be a myopic astigmatism of a $\frac{1}{4}$ cylinder, the axis in the right eye being at 170 degrees and in the left eye at 80 degrees.

In his experience, Bull, of Paris,¹⁷¹ has not found a single fact to justify the belief in partial contractions of the ciliary muscle and in its causing or correcting astigmatism, as urged by Dobrowolski, of St. Petersburg. He thinks that the neutralization of cylindrical glasses, which Dobrowolski believes to be due to the action of accommodation, is really dependent upon the lids, whilst the cases of astigmatism examined with the stenopæic slit do not show that accommodation has any other effect than that of increasing equally the convexity of the lens in all its meridians. He further believes that the cases of Landesberg do not prove that accommodation can cause any astigmatic increase or decrease; and he says that it is impossible to accept either the view or the method of investigation of Martin.

Chauvel²⁴³ compares the statistics of the examinations made at the Val-de-Grâce from 1885 to 1890 with those reported in his memoir of 1886, and finds very little difference in the proportion or in the form of ametropia. The degree of astigmatism had increased, however, in cases previously observed; probably, as he says, from the fact that Javal's ophthalmometer was used to estimate it in the latter period. The slighter degrees of astigmatism were mostly found in myopic eyes, whilst the higher degrees were found in hypermetropic and emmetropic eyes. Lambert, of New York,¹ is convinced that retinoscopy is the most accurate objective test for estimating astigmatism, particularly when of small degree.

In a certain number of cases in which the findings of retinoscopy differed from those found with trial lenses, Burnett, of Washington,³⁴⁷ noted a play of shadows within the illuminated area which moves across the pupillary space, very similar to what is observed in conical cornea. He found the visual acuteness in such instances to be below the normal when the internal shadows

were at all pronounced. Spalding, of Portland, Me.,¹⁰¹⁸ considers the violet-glass test of Donders especially valuable in the detection of astigmatism, particularly in those instances where the axis is either against the rule or is obliquely placed. Rindfleisch, of Heidelberg,³⁵³ describes a simple apparatus for the objective estimation of anomalies of refraction. The object of the instrument is to aid in the performance of retinoscopy by doing away with the awkwardness of changing the lenses. A series of glasses are mounted upon a circular disc having a hole in the centre; this disc can be turned with the index finger of the hand holding the instrument until the proper lens has come before the eye. The mirror is held with the other hand.

Stewart, of Philadelphia,⁵³ has had favorable results in the determination of refractive errors by the use of gelatin discs containing homatropine and cocaine. Bullard, of Columbus, Ga.,⁸¹ urges the importance of ordering plane smoked glasses in place of coquilles, as he has found that the latter usually have the effect of concave cylindrical lenses. Swasey, of Worcester,⁹⁹ says that the ophthalmometer of Javal and Schiötz indicates accurately both the amount and the axis of the corneal astigmatism, and that its readings may be followed more closely than the rule established by Bull, of Paris, calls for. While considering the ophthalmometer of Javal, one of the greatest aids in refraction work, Black, of Denver,²⁴⁹ cites a number of cases to show that the instrument is sometimes not sufficiently accurate to permit the prescribing of glasses by it alone, and that it does not enable us to do away with atropine in young people.

Davis, of New York,^{1, Sept. 10} is of the opinion that "the ophthalmometer is a surer means of obtaining the correct axis of astigmatism and the axis of the glass that will be accepted by the patient than suspending the accommodation by the use of atropine, and obtaining the axis by that means." Woodward, of Burlington, Vt.,¹ states that, in his hands, the variation incident to the ophthalmometer in the diagnosis of astigmatism is not a constant quantity. In explanation of this, the author gives the following reasons: "1. The anterior surface of the cornea is not spherical, it is ellipsoidal; hence the measurement of its curvature by the Javal-Schiötz instrument is only approximately correct. 2. The ophthalmometer does not deal with that portion of the cornea

through which the visual line passes, but with an annular segment about one millimetre distant from the visual line. It must be assumed that the curvature at the visual line is the same as that of the surface measured. This may or may not be the case; hence another source of error in ophthalmometry. 3. The ophthalmometer does not inform us respecting the posterior surface of the cornea; if this be not parallel to the anterior surface, that condition will influence the refraction of light. There is no reason to suppose that the surfaces of the cornea are strictly parallel to each other, and hence another source of error in ophthalmometry. 4. The ophthalmometer does not measure lenticular astigmatism, and this may be an important error."

The following brief summary of the facts to which his paper upon *manifest and latent hyperopia* is designed to direct attention is given by Jackson, of Philadelphia ⁶¹: "The latency of hyperopia is essentially exceptional, inconstant, and abnormal. It is more frequent or proportionately greater in childhood or in early adult than in middle life. The amount of manifest hyperopia discovered depends largely on the method of testing for it. It would usually be unnecessary to employ a mydriatic to render manifest the total hyperopia, if we only had some certain means of detecting the exceptional cases in which it is necessary. A mydriatic is frequently needed, as strong to render manifest the total hyperopia at forty-five as at fifteen. In correcting hyperopia without the use of a mydriatic, the assumption should be that the total hyperopia is manifest. To add something for assumed latent hyperopia will, in a majority of cases, entail imperfect distant vision, which will continue as long as the lens thus ordered is worn. In prescribing a lens correcting less than the total hyperopia, in allowing for latency of a part of the hyperopia, we are allowing for an inconstant, temporary, mainly abnormal condition, and should warn the patient of the probable early need for a change of lenses, and that the best and most permanent relief is not to be expected until such change is made."

Starr, of Buffalo, ¹, has devised an *optometer*, which consists essentially of a strong convex spherical lens, combined with a concave spherical glass of equal refracting powers, so arranged that every possible degree of spherical lens action, ranging from zero to the strength of the component lenses if separately employed, can

be obtained. The author claims that, in the use of this instrument, the accommodative power is not provoked, and that the size of the retinal images remains the same for all eyes examined. Randall, of Philadelphia,⁶¹ gives a detailed description of the method employed by him in examining the eyes of school-children. An unusually high degree of hypermetropia has been seen by Wallace, of Philadelphia,¹¹² in a boy 6 years of age, the correcting glass for the highest meridian being about 20. D.; the radius of curvature was 7.7 millimetres, its diameter being 10 millimetres. Gould, of Philadelphia,²⁴⁹ has observed an unusually high degree of compound hyperopic astigmatism, requiring for its correction + S. 8. D. ⊖ + C. 2.5 D. ax. 80° in 0. D., and + S. 8. D. ⊖ + C. 2.25 D. ax. 100° in 0. S.; visual acuity in each eye equaling $\frac{2}{3}$ partially. Burgeois⁵⁷ thinks that, where aphakia exists, it is better to give a +16 spherical lens for near work, so that, by the adjustment of a —6 spherical, the required +10 spherical for distant use may be gained, thus avoiding any changing of glasses.

E. L. Jones²⁴⁹ gives an instance in which an aphakic patient intuitively obtained the necessary cylindrical effect from a spherical glass to enable him to secure an acuity of vision equal to that obtained from the proper sphero-cylindrical combination. Fukala, of Pilsen,²⁵⁴ asserts that the average decrease in refractive power in aphakic eyes is 15.5 D., as, in twenty-three cases of aphakia, he found that to be the strength of the average correcting glass. Further, two myopes of 15. D., after being made aphakic, needed no correcting glass. In binocular metamorphopsia produced by correcting glasses, Friedenwald, of Baltimore,²⁴⁹ notes a peculiarity which he deems of the utmost importance,—viz., that the side which appears to be lengthened seems to be the one which is more distant, though the plane of the surface of the object looked at be perpendicular to the visual axis. He thinks that this fact proves that the apparent change depends upon stereoscopic illusion.

Fick, of Zürich,⁸⁵³ agrees with Sulzer that the contact glasses for the correction of irregular astigmatism should not be made of blown glass. The author claims that when they are used in conjunction with the ordinary spherical and cylindrical lenses, the vision in cases of irregular astigmatism is often considerably improved. In thirteen instances where this was not so, the author suggests three possible causes: (a) spherical aberration of the

contact glass; (b) astigmatism of the lens; (c) amblyopia from nervous origin.

SECTION IV.

DISEASES OF THE ORBIT.

Dujardin²²⁰ gives an instance where a piece of pipe-stem *penetrated the floor of the orbit* and traversed the maxillary antrum, remaining imbedded in the maxillary bone. The foreign body gave rise to conjunctivitis, with much oedema and ectropion. To explain the absence of infection in this and other similar cases, the writer suggests the action of the pipe as a drainage-tube in getting rid of septic material. Leplat²²³ reports a case in which a ball from an air-gun lacerated the conjunctiva and internal rectus-tendon, and finally fractured the inner wall of the orbit. The lens was dislocated, and the iris was ruptured. A slight retinal haemorrhage took place. Capsular advancement was done, which brought the eye into its proper position. Ryan²²⁵ has removed a piece of slate-pencil measuring nearly an inch and a half in length from the orbit of a child 6 years of age. The author is of the opinion that, from its depth in the orbit and from the direction of its axis, it must either have pierced the upper and outer orbital wall or else must have lodged in the sphenomaxillary fissure. He believes that in either case the brain-substance was probably injured, although there were no signs of any such damage. Gallemaerts²²⁹ reports three cases of penetrating wounds of the orbit with lodgment of foreign bodies, illustrating tolerance of the orbit for such substances. The author draws attention to the necessity for the careful examination of the wound, in order that the presence of the foreign body may not be overlooked. Palmer, of Chicago,¹⁹² removed a sliver of wood from the orbit, that had remained *in situ* five and a half months, exciting continuous suppuration. Its removal was attended with complete recovery in a week's time.

Köhler²⁰¹ has seen temporary restriction of the movements of the globe in all directions following a penetrating wound of the right orbital cavity. Recovery took place without any impairment of vision or of the motions of the ball. Pfalz³⁵⁸ has seen a case of total ophthalmoplegia externa and interna following a penetrating wound at the inner angle of the eye. The author suggests that

the symptoms were caused by an injury to the inferior ophthalmic vein, the resulting hæmorrhage exerting pressure upon the nerves lying in the superior orbital fissure. An interesting feature of the case was the rapid disappearance of the paralysis, due, as the author thinks, to the stimulation of the retina by light. In view of this fact, he advises that all cases of curable ocular palsies should be subjected to visual exercise. Pooley, of New York,¹⁸⁸ reports an instance of emphysema of the orbit, eyelids, and surrounding parts, following traumatism. A peculiarity of the case was the presence of small vesicles under the skin of the upper lid,—doubtless air-bubbles,—which changed their position. Guhl²¹⁴ notes a case of traumatic emphysema. The eyelid had been penetrated by a piece of glass, which had produced a communication with the nose. Callan, of New York,²⁰⁶⁵ gives the notes of four cases of orbital traumatism resulting in immediate monocular blindness. The second case is of special interest. The patient, immediately upon receiving a blow over the left eye, noticed that the right eye became blind. This was followed in seventy-two hours by ptosis, and later by ophthalmoplegia externa, on the injured side. Six weeks later the ocular movements had returned in part, and objects held in the upper nasal field could be seen. The optic nerve was entirely wanting in capillarity, and became atrophic. The author attributes the lesion to a fracture of the orbital bones extending to the optic foramen.

Cross, of Bristol, England,⁷⁸ records three cases of *empyema of the frontal sinus*, all occurring in young adults. The first was treated by puncture and drainage of the cavity. The second terminated fatally. It was that of a girl, 16 years of age, who presented a fullness in the upper orbital region extending to the inner side and above and behind the globe. An incision was made into the swelling and a quantity of semi-purulent matter escaped, after which the cavity was syringed with bichloride solution. Four and one-half months later there was a recurrence of the symptoms, and a drainage-tube was passed from the sinus into the nasal cavity. A third recurrence taking place, the inner wall of the orbit was freely removed with a considerable portion of the ethmoid, leaving a thickened nasal mucous membrane. The cavity was then scraped with a blunt spoon. The patient died a few days after from a meningitis following the operation.

Bistis²² reports a case of *cellulitis of the orbit* following stenosis of the lachrymal canal. F. Fergus, of Glasgow,²¹³ gives the notes of a case of orbital cellulitis with the formation of an abscess, apparently due to secondary infection, either from a carious tooth or from a septic condition of the instrument used for its extraction. McKay, of Wilmington, Delaware,¹⁰⁷ reports a case of orbital cellulitis following mastoiditis, in a woman 44 years of age. The eye was blind, the pupillary area being occupied by a grayish-white reflex and the vitreous body being opaque. The ball became atrophic, and the orbital contents were greatly shrunken.

Uszynski, of Czernowitz, Austria,³⁵³ reports a case of *retro-ocular abscess*, producing proptosis and oedema. The ophthalmoscope showed that the tunics of the eye were compressed to such an extent that the fundus between the disc and the macula was best seen with + 3. D., whilst the rest of the eye-ground was emmetropic. Evacuation of the pus was followed by a marked amelioration of the vision, which had been much lessened. The proptosis and oedema soon disappeared. Holt, of Portland, Maine,³⁴⁷ has seen five cases of orbital cellulitis in which the inflammation, spreading to the temporal region and thence to the neck, interfered with deglutition, extended to the brain, and produced death. A case of recurrent bilateral inflammation of the capsule of Tenon, in connection with mercurial poisoning, is reported by Kipp, of Newark, New Jersey.³⁴⁷ The first attack resulted from an injury, but inflammation recurred as long as the patient was exposed to the influence of the metal.

In experimenting on the subject, Boddaert¹⁷¹ has found that *exophthalmos* could at best be but temporarily produced by ligation of the external jugular. Contrary to the views of Ranvier, he found a slight degree of oedema. He further says that exophthalmos was easily obtained by section of the cervical sympathetic. Zirm, of Vienna,⁸⁴ believes that the differential diagnosis of the various forms of exophthalmos may be usually easily made. In an early stage, however, he states that it is very difficult to differentiate between an exophthalmos caused by inflammation of the retrobulbar connective tissue and one produced by an intra-orbital phlebitis, as the early symptoms in each are almost identical. If the disease be occasioned by phlebitis, the inflammatory

process usually extends to the brain, causing thrombosis of the cavernous sinus, and to the local symptoms of an inflammatory exophthalmos there are added those of meningitis. The subsequent occurrence of exophthalmos of the other eye would also indicate the presence of a thrombosis of the sinus. On the other hand, if the exophthalmos occurs first, and afterward symptoms of cerebral lesions appear, the diagnosis of thrombosis of the cavernous sinus could be made.

Pooley, of New York,¹⁰⁰⁷ reports a case of *intra-orbital cyst*, probably dermoid in character, in a man 23 years of age. The growth was situated between the superior rectus muscle and the external wall of the orbit. From his experience in the treatment of the case, the author is led to believe that "the removal of such a tumor in its sac is practically impossible, and that the proper operative course is to keep the orbit drained by a tube, and to inject its cavity until healing takes place from the bottom." Dunn, of Richmond, Va.,³⁴⁷ has removed a dermoid cyst from the orbit of a girl 16 years of age. The growth was situated at the inner angle of the eye, apparently just above the lachrymal sac. An incision into the tumor, followed by injections of nitrate of silver, failed to eradicate it. One year later the cyst was dissected out, and was found to have a tough, fibrous wall. Yakoubian²⁸³ details a case of dermoid cyst of the orbit in a child 3 years of age. The globe had been so compressed by the growth that its enucleation was performed at the time of the extirpation of the tumor.

In an article upon "Tumors of the Orbit, Secondary or Consecutive to Tumors of the Neighboring Bony Cavities," C. S. Bull, of New York,¹ has formulated the following conclusions:—

Tumors of the Sphenoid.—So long as a pathological process, whether it be inflammatory or a new growth, is limited to the antrum of the sphenoid, the subjective symptoms are either entirely absent, or there may be severe pain in the head. If the process extends to the neighboring structures, symptoms arise which point to the probability that the sphenoid bone is the seat of the disease, such as blindness due to the compression of one or both optic nerves, the visible or tangible presence of the growth in the nasopharynx, ethmoid, orbit, or skull. The entrance of the growth into the cranial cavity may occur without any subjective symptoms, or there may be severe headache. If the progress of the growth

is very rapid, meningitis or cerebral abscess will result. The ophthalmoscopic symptoms are either papillitis or atrophy of the optic nerves, due to perineuritis and pressure of the swollen nerve-sheath on the optic nerve-fibres. In some cases the pressure is exerted on the optic nerve in the optic canal. Tumors of the sphenoid antrum may perforate the middle fossa of the skull without causing blindness; and when blindness does occur in these cases, it is not necessarily due to pressure on the optic chiasm, for it may be unilateral. If an orbital tumor rapidly causes blindness, and the latter starts from the temporal side of the field and leaves the region of the macula lutea unaffected to the last, and if, at the same time, a growth appears in the naso-pharynx, it is probable that the tumor began in the sphenoid antrum.

Tumors of the Ethmoid.—A morbid growth confined within the ethmoid cells gives rise either to no symptoms at all or merely to headache. Inflammation of the mucous membrane lining the ethmoid cells may extend from the naso-pharynx, the frontal sinus, the maxillary antrum, or the orbit. The ethmoid cells may be turned into a single large cavity by a collection of mucus or pus within it. So long as a tumor is contained within the limits of the ethmoid cells there are either no subjective symptoms or there are paroxysmal headaches, with a feeling of heat and epistaxis. The orbital symptoms are the same as those of tumors of the orbit. The motility of the eyeball is limited. The vision may be only slightly affected, or there may be complete blindness. The visual field may not be affected. If the tumor has entered the naso-pharynx, the mouth is more or less open and the speech is nasal. Later there is a loss of the sense of smell. If the ethmoid cells are opened into by the growth, there is more or less continuous dropping of cerebro-spinal fluid from the nose, owing to a communication between the upper wall or roof of the ethmoid cells and fissures at the base of the skull. There may also be orbital or palpebral emphysema and haemorrhage from the nostril on the same side.

Mucocele, or Abscess of the Frontal Sinus.—In chronic inflammatory disease of the frontal sinus there may or may not be supra-orbital pain. If the process is confined to the frontal sinus, there is no other symptom. If, in addition to the pain, there is sensitiveness on pressure over the frontal boss, swelling along the

lower surface of the supra-orbital margin and along the inner wall of the orbit, and displacement of the eyeball downward and outward, it is probable that the disease has extended from the frontal sinus to the ethmoid cells. If, in addition to these symptoms, there are coryza, ozaena, and a purulent discharge from the nostril, the nasal meatus has become involved and the diagnosis is certain. But, unless all of these symptoms are present, the diagnosis is very difficult and almost impossible. If the first symptom of orbital complication is the appearance of a dense, hard swelling at the upper and inner angle of the orbit, along the superior orbital margin and the region of the lachrymal bone, and if the growth is slow and painless, the disease is almost certainly an *osteoma* of the frontal bone, which will eventually involve the orbital plate of the ethmoid, and later the cavity of the skull.

Tumors of the Maxillary Antrum.—Tumors of the antrum may cause pain in the teeth or in the region of the infra-orbital nerve, but not until they have attained considerable size and have more or less completely filled the antrum, the distension of the walls of the cavity causing the pain by pressure on the nerve-twigs. Subsequently the diagnosis may be rendered easier, either by a projection forward of the anterior bony wall, or by dislocation of the eyeball upward and outward, or even upward and inward, by the protrusion of the floor of the orbit. Usually at this stage of the growth the tumor may also present in the nasal meatus or pharynx, or both. In no case is it possible to diagnosticate a tumor of the antrum early in its development.

Jones, of Manchester,² has successfully ligated the common carotid artery in a woman 25 years old, who presented a pulsating tumor of the orbit. Murray⁶, reports a case of aneurism of the supra-orbital artery cured by thumb-pressure applied by the patient. The artery had previously been ligated for aneurism; the second dilatation occurred on the proximal side of the remaining cicatrix. Israel⁶⁰ cites an instance of pulsating exophthalmos, due to *retrobulbar angioma*. There was a swelling in the orbit, which extended to the temple, the mass pulsating synchronously with the carotid. The color of the tumor could be changed from gray to blue by pressing upon the jugular. The patient's family was neurotic, and there was evidence that heredity was the causal element.

Bock, of Laibach,¹⁵⁰ saw an *angioma cavernosum*, in a boy 7 years old, which originated at the root of the nose and extended to the lids, the caruncles, and the conjunctiva of the left eye. The tumor had been growing for two years. The position of the globe was altered and its motions restricted. Philipsen¹⁷¹ has recently seen an infant who developed exophthalmos and a displacement downward of the right eye, with the appearance of an elastic, semi-fluctuating tumor under the orbital roof, on the second day after birth. Although in a very unusual position, a diagnosis of *cephalohæmatoma* was made, which was confirmed by the gradual return of the eye and the disappearance of the tumor. Barrett, of Victoria,²⁸⁵ reports five cases of *hydatid disease of the orbit*, a study of which, together with the literature upon the subject, enables him to formulate the following: That, clinically, there are two classes, retrobulbar and subconjunctival; that if, in an orbital affection, the symptoms do not subside and no abscess exists and tapping does not reveal the characteristic fluid, hydatid disease can be eliminated from the diagnosis; that, in retrobulbar cases, repeated tapping is the safest operative proceeding. Silcock, of London,² gives the notes of a case of *epithelioma* involving orbit, nose, pharynx, and the cranial cavity. The growth had first made its appearance above the left eyebrow, and seemed to have had its origin in one of the sinuses connected with the nose.

De Wecker, of Paris,⁷³ records a case of *hernia of the adipose tissue of the orbit* successfully dealt with by excision of the fatty masses. The author says that these hernias occur most commonly in women of advanced years. He thinks that, apart from these senile hernias, there are others of traumatic origin. He believes that the subconjunctival lipomata of early life may be considered to be congenital, being due to a fault of development of the capsule of Tenon.

Jackson, of Philadelphia,⁶¹ has removed an *osteoma of the left orbit*, with preservation of vision. The patient was a girl 18 years of age. The growth was removed by making a free incision through the upper lid, below and parallel to the upper margin of the orbit. According to the author, it is interesting to note in this case that, "although the tumor appeared in the outer two-thirds of the orbit, its origin was from the upper inner angle,

about three-fourths of an inch back from the orbital margin, and the displacement was directly forward and downward. Although the eyeball had been carried forward to the extent of almost a centimetre, and the insertions of the muscles to that extent removed, there had been no squint or diplopia, very little heterophoria, and no marked weakness of the ocular movements. All the movements of the eyes, except that of elevation of the upper lids, were completely restored within a few weeks. In the removal of the exostosis, which was, throughout almost its whole extent, of ivory-like hardness, the common bone-drill, worked simply by hand, penetrated rather rapidly, and proved by far the most efficient as well as the safest means of attack."

A case of rare form of orbital tumor has been seen by Frothingham, of Detroit,⁶¹ in a girl 16 years of age. The growth occupied the right orbit, and was situated above the levator palpebrarum and close to the orbital plate of the frontal bone. It appeared as a prominence, on a level with the bony margin of the right orbit. There were also two smaller tumors on the left orbit, one at the outer margin and the other below the eye. The growth in the right orbit, which was removed and was found to have extended a little more than an inch and a half into the space, measured about one and a half inches along its anterior and posterior borders. The tumor was wedge-shaped, and had the appearance of dense, white, fibrous tissue. Histologically, it proved to be a fibrosarcoma. A tumor of like nature, and similar in position and size, was also removed from the left orbit.

White, of Richmond,⁷⁶ gives the notes of four cases of orbital and ocular growths. The first case was one of melanotic sarcoma, originating in the ciliary body. The second was one of sarcoma of the orbit, having its origin in the subconjunctival tissue of the lower *cul-de-sac*. To secure the removal of the growth, it was found necessary to enucleate the globe. The third was a case of recurrent fibroid of the orbit, which extended from the inner and lower orbital rim back to the sphenoidal fissure. In the removal of the growth the eye, which was perfectly good, had to be sacrificed. The fourth case was one of tuberculous tumor of the orbit in a healthy girl 16 years of age. The growth, which was pear-shaped, with a cord-like projection, was attached to the outer and lower orbital margin, and extended backward

behind the eye. Histologically, the tumor closely resembled miliary tuberculosis.

Ramsay, of Glasgow,²¹³ extirpated a large sarcomatous mass in the orbit, which was secondary to a small choroidal growth found in a phthisical globe, to which the secondary mass was attached. The first symptoms of the choroidal disease were manifested six years previously, as attacks of pain which recurred with great regularity annually. The insignificant size of the primary tumor in the choroid, as compared with the large mass of the secondary growth, led the author to emphasize the importance of a microscopical examination of the choroid in all cases of orbital sarcoma where at first sight a primary choroidal growth appears to be absent. Clegg, of Liverpool,¹⁶⁷ reports a case of orbital tumor, followed by indications of cerebral growth, in a man aged 31 years. There was double optic neuritis with exophthalmos on the left side, and transient right hemiplegia with persisting aphasia.

DISEASES OF THE LACHRYMAL APPARATUS.

In a case of *congenital obstruction of the nasal duct* seen by Patterson, of Michigan,¹⁰¹⁸ acute dacryocystitis existed at the time of birth. In considering the etiological factor of intra-nasal lesions in the production of disease of the lachrymal passages, de Schweinitz, of Philadelphia,⁶³, points out that epiphora may result from an obstruction of the lachrymo-nasal duct from swelling of the mucous membrane, having its primary origin in chronic or subacute post-nasal catarrh, while the same symptoms may arise from atrophic changes with contraction, a part of a similar process in the intra-nasal passages. He believes that lachrymal abscess may be traced to chronic pharyngitis, with involvement of the mucous membrane of the lachrymal duct, producing true stricture, interference with drainage, and development of pathogenic organisms. Obstruction may exist at the intra-nasal end of the duct, so slight as to be permeable to injected fluids, but impassable to the flow of tears. Lachrymal affections, primarily due to hypertrophy of the turbinate bone, suffer exacerbations from recurrence of the nasal trouble following exposure. Gradle, of Chicago,⁶¹,_{Sept. 10} considers four methods by which nasal disorders may lead to eye symptoms and lesions: 1. By processes of growth, causing extension of tumors through the sinuses into the orbit or into the cranial cavity, and hypertrophies

involving mechanically the nasal end of the duct. 2. By extension of infection through lymph-vessels and foramina or deficiencies in the bony walls, or by continuity of surface; spread of inflammatory processes into the lachrymal sac and into the orbit, thus affecting the intra-cranial portion of the optic nerve. 3. By circulatory disturbances, which occur in the form of venous congestion whenever mechanical conditions exist in the nose which impede the circulation. 4. By nervous disturbances, the so-called reflexes, but to which the author applies the term "sensory neuroses of peripheral (*i.e.*, nasal) origin."

Peters,⁸⁵⁹ Nov., 1881, reports seven cases of so-called *blennorrhœa of the lachrymal sac* in newborn infants. He believes that this condition can usually be accounted for by an atresia of the nasal opening of the lachrymal canal, caused by a failure of absorption of the embryonic tissues in this position. When such a condition exists the cells lying in the canal proliferate, break down, and their product, not being able to escape into the nose, makes its appearance in the conjunctival sac. The author recommends the avoidance of sounds, and says that slight digital pressure over the sac, combined with frequent cleaning of the eye, will work a cure in a short time. Weiss, of Heidelberg,⁸⁵⁸ July, 1881, does not believe that the treatment recommended by Peters will cure all cases; nor does he think the etiology advanced by the same author to be the true one. He reports several cases observed by him which were promptly healed by probing after digital compression had failed. He therefore recommends this plan of treatment in cases which are not cured in a few days by the method of the former author.

In support of Peters's theory, Lange, of Braunschweig,⁸⁵⁸ Sept. cites the following case, occurring in a child 5 days old. There were symptoms of blennorrhœa of the lachrymal sac. Pressure upon the sac was followed by discharge of laudable pus from the nasal cavity of the same side, but none came from the lachrymal canals. In a few days the abnormal symptoms had disappeared.

Heddaeus, of Idar,⁸⁵⁸ confirms the observations of Peters upon blennorrhœa of the lachrymal sac in newborn infants, but differs with him in thinking that the mechanical expression of the contents of the sac is, in many cases, unnecessary. The fact that the eye is comparatively free from the products of inflammation upon waking is most significant in the diagnosis. He also makes a

review of the literature, with the view of showing that the condition is by no means so rare as is supposed.

In the treatment of affections of the lachrymal sac and nasal duct, Gama Pinto, of Lisbon,¹⁷¹ deprecates the passing of too large instruments and the slitting up of the canaliculi. Where dilatation alone of the superior canaliculus has failed, he is content to keep the passages patulous with an astringent solution. To suppress the functions of the sac, he incises it anteriorly and obliterates the canaliculi with the galvano-cautery. Risley, of Philadelphia,^{61,17} pleads for a more conservative method of treating *lachrymal obstruction*. He finds it possible to thoroughly cleanse the lachrymal sac and to inject any desired application for the relief of inflammation of its walls through the dilated or enlarged punctum without slitting the canaliculus. He thinks that the proper treatment of acute blennorrhœa of the sac, when seen early, should consist in the use of hot compresses and antiseptic injections. If the swelling is great and suppuration threatens, he advises an incision into the sac and, after slitting the canaliculus, the passage of proper probes. Gould, of Philadelphia,⁹, condemns the routine practice of slitting up the canaliculus in cases of epiphora and dacryocystitis, and draws attention to the sphincter-like action of the punctum, which enables it to keep any irritating foreign bodies from getting into the connecting drainage system. Gould, of Philadelphia,¹, suggests the following plan of treating lachrymal obstruction: After emptying the sac and canaliculi by pressure, the depression formed by the nose, orbital border, and superior maxilla is filled with a certain form of boric-acid solution. The pressure is slowly lessened, when "by suction and capillary attraction" the fluid passes into the lachrymal passages. After the lapse of half a minute, pressure is again applied toward the nose and downward, so as to force the solution into the duct. If this procedure be inadequate, the author advises that an incision, not exceeding an eighth of an inch in length, should be made into the canal, thus hoping to get better ingress and egress.

Trousseau, of Paris,¹⁷¹ has reported a case of a girl, 17 years old, where excision of a portion of the lachrymal gland, for excessive lachrymation, was followed in fifteen days by a catarrhal conjunctivitis, which resisted all treatment and became chronic. Altabas, of Barcelona,⁴⁵⁶ reports two instances of epiphora that

were cured by extirpation of the lachrymal sac. Both had resisted all other means of treatment.

In a case of *hernia of the lachrymal gland*, produced by traumatism, Panter, of Dorchester, Neb.,¹⁰⁸ removed the protruding portion without interfering with the function of the gland. Schroeder, of St. Petersburg,¹⁰⁹ describes a case of acute *dacryoadenitis* which he saw complicating a double parotitis of an epidemic nature. The author is inclined to view the inflammation of the lachrymal gland as a sequel to that of the parotid. Elschnig, of Graz,¹¹⁰ reports a case of double acute dacryoadenitis, in a healthy man, which was apparently produced by exposure to cold and moisture. The inflammation in one gland developed two days after the exposure, and in the other forty-eight hours later. The great constitutional disturbance leads the author to think that there was a general microbial infection. The lachrymal secretion was checked, and a severe conjunctivitis ensued, which did not yield to treatment until after re-secretion of the tears. This latter occurred fourteen days after the disease had subsided. Chauvel¹¹¹ has observed 50 cases of dacryocystitis. In 24 the affection was bilateral, and there was usually an interval of several months after the time of infection. The author found lachrymal abscess in 6 instances, carbonic suppuration in 21, while in the remainder simple epiphora was the only sign. Acute conjunctivitis, cutaneous fistula, abscess of surrounding tissues, and necrosis of the lachrymal bone were the more frequent complications. In 38 cases the lower canaliculus was divided, in 60 the upper, and in 1 case both. The canals were dilated with Bowman's probes,—sizes 3 to 6. In only 8 cases was a cure effected. Snell, of Sheffield,¹¹² reports a case of symmetrical dacryoadenitis in a married woman aged 36 years. The internal administration of iodide of potassium was followed by rapid subsidence of the swelling. During the period of marked enlargement of the glands there was a noticeable diminution in the secretion of tears. McCullough¹¹³ has successfully used a 10-volume peroxide of hydrogen in an 8-year-old case of lachrymal abscess with fistula. Guaita, of Siena,¹¹⁴ aims at the rapid cure of dacryocystitis by a free external excision into the sac. After curetting the sac he introduces a cannula, made of the decalcified femur of a large toad, into the previously dilated nasal duct. Giulini, of Nuremberg,¹¹⁵

removed a small *round-celled sarcoma* from the region of the lachrymal gland of each eye. But one specimen showed traces of the glandular structure.

DISEASES OF THE EXTRA-OCULAR MUSCLES.

Wallace, of Philadelphia,¹⁰¹⁸ directs attention to the fact that the deviation produced by a combination of two centrads does not represent the sum of the deviations produced when each centrad is employed separately. He also gives an original formula, from which he has derived a table giving the degree of the prism and the angle of rotation necessary to produce the effect of two prisms with their bases at right angles. Parinaud, of Paris,¹⁷¹ reiterates the statement he had formerly made, that the theory of *congenital muscular insufficiency* is false and unphysiological, and asserts that what is generally called an insufficiency of the internal recti is really an insufficiency in the innervation of convergence. According to this writer, there is a congenital central predisposition to insufficiency of convergence, which in the development of internal squint has a close relation to the functions of accommodation and fusion, and hence to the state of refraction. He divides the cases of insufficiency of convergence clinically into two classes: (1) an accidental and often transitory form, and never developing into (2) the confirmed form, where the insufficiency in the convergence develops itself in infancy and becomes more marked with increase in years. He says that myopia and whatever affects the vision favors its growth. As expressive of disturbances in the symmetrical action of the oblique muscles, Price, of Nashville,¹⁰⁰⁷ proposes the term "*cyclophoria*" to designate the condition in which there is a tendency for the eye to rotate on its antero-posterior diameter or axis. Savage, of Nashville,¹⁰⁰⁷ suggests that certain cases of *heterophoria* are caused by the maculae occupying dissimilar positions in the two retinæ, and also by the eyes being abnormally placed in their orbits. The author considers operative interference necessary in those cases of heterophoria in which diplopia is manifested by the employment of a plane red glass.

Hansell, of Philadelphia,³⁴⁷ has made an analysis of the symptoms present in a series of cases of *hyperphoria*. In ten the manifestations were purely local, while in four the most promi-

nent symptoms were excessive nervousness, irritability of temper, and at times mental confusion. Cotter, of Macon, Ga., ^{July 9,} states that he is convinced that eye-strain is seldom caused by heterophoria. Connor, of Detroit, ⁶¹ _{Sept. 10}, reports a case in which heterophoria was apparently the cause of acute rhinitis, loss of smell, and tinnitus aurium in a woman 28 years of age. The conclusions drawn from the case by the author are as follow: "1. An exophoria of 12 degrees, uncomplicated with any other deformity or disability of the eyes, did produce and continue for more than two years a most distressing affection of the nares. 2. Indirectly this exophoria caused loss of smell, tinnitus aurium, and deafness, with great nervous prostration. 3. In one such case the correction of the exophoria by prisms aggregating 12 degrees produced immediate relief, which has continued during two months and more. It also indirectly cured the tinnitus, increased the hearing and the sense of smell. 4. There is no reason to deny that in another case the disturbance induced in the nerve-centres by an exophoria may not attack other organs or apparatuses, and induce in them effects similar to those we have seen induced in the nares and adjacent structures."

Stevens, of New York, ⁶¹ _{Aug. 27}, states that a study of more than two thousand cases, in which the condition of the ocular muscles had been carefully and repeatedly observed, and in which photographic portraits had been taken, demonstrates that certain well-defined types of facial expression are not only associated with, but are dependent upon, certain relative tensions of oculo-motor muscles. In an eminently practical article upon some of the means for the determination of heterophoria, Stevens ¹⁰⁰⁷ _{Jan. Feb.} states that "the phorometer, while leaving much for us to learn, is absolutely reliable in the respect that it does not apparently reveal conditions which do not exist, while the ease and rapidity with which its results are determined leave nothing in that respect that can be desired. It is the instrument on which we must rely for our principal information, the other tests being auxiliary."

Eaton, of Portland, Ore., ¹⁰¹⁸ _{Oct.} has found the *keratoscopic arc* designed by de Wecker and Masselon to be accurate, rapid, and easy of application as a strabismometer. This, he thinks, is especially true after tenotomies, where the passive position of the operated eye is desired in order to give a prognosis whether

operative correction is necessary. Bumstead, of Decatur,¹⁰¹⁸ has found the *Ridgeway test*, which is practically identical with that of the Maddox rod, very valuable for the detection of heterophoria, and for the recognition of diplopia in cases of strabismus, or in eyes unused to binocular vision. Priestley Smith, of Birmingham,⁷⁰ after referring to the valuable articles of Maddox²⁶ on the clinical study of ophthalmoscopic corneal images, gives an extended description of the method which he now employs. The patient should be made to fix his eyes upon either the mirror or the forehead of the observer, while the latter, looking through the hole in the mirror, throws the light into one of the patient's eyes, and accurately notes the position of the corneal reflex in relation to the area of the illuminated pupil. The mirror is then quickly rotated to the right or left, and a similar observation of the other eye is made. The position of the corneal reflexes is now compared. If the reflexes are symmetrically placed, and do not change their position in relation to the pupil as the light is transferred backward and forward from one eye to the other, the patient has for that particular point and distance binocular vision. If symmetry exists at first, but is followed by an altered position of the reflex in one eye after a time, latent difficulty in binocular fixation is present. If there is asymmetry of the reflexes which does not disappear, and in which the illuminated eye always fixes the mirror, then both eyes have the power of fixation, but not of fusion. If, however, it is always the same eye which persists in fixing the mirror, then there is little power of direct fixation in the deviating eye. If both eyes appear to fix when the light is thrown into one eye, whereas when it is transferred to the other eye the latter shifts its position so as to show a slightly-displaced reflex, pronounced or absolute scotoma probably exists in the shifting eye.

In discussing *orthoptic training*, Culver, of Buffalo,³⁴⁷ says that its applicability to the extrinsic muscles which cause vertical movements in the eyeballs is of no practical utility. He recommends its use where the training or exercise of the lateral recti muscles is indicated. He describes a new fixation object which he uses in the application of the method. Prince, of Springfield,⁶¹ gives brief extracts of a dozen cases, illustrating some of the various phases of discomfort, in which relief was obtained from the use of the fourth-degree prisms.

From an analysis of five hundred and thirty-nine cases of *convergent strabismus* in which no pathological changes were said to exist, and over fifty cases in which such conditions were present, Seabrook, of New York,²⁴⁹ finds that in general it is the higher degrees of H with which strabismus convergence is combined and that so-called congenital amblyopia is ametropia. In divergent strabismus H and divergence are associated with more frequency than is generally supposed, the myopic cases being usually associated with disease (if decided choroidal atrophy with greatly diminished V be counted with the other diseases), and that good V in both eyes is far less frequent in strabismus divergence than in strabismus convergence. In the treatment of squint, Baker²⁵⁰ has been governed by the following rules: A full correction is ordered in cases of alternating strabismus where the vision is nearly equal in the two eyes, also in cases where the strabismus is fixed in one eye, provided that the vision of that eye be good; if, however, the vision of the squinting eye should be bad and cannot be improved by the proper correction nor by orthopædic exercise, the author advises operation after the sixth year. In cases where the squint is fixed in one eye, and the vision of this eye is but slightly deficient, operation should only be done after all other means have failed. In insufficiency of the oblique muscles, Savage, of Nashville, Tenn.,¹⁰⁰⁷ has obtained marked improvement by exercising the weak muscles. This he claims to have accomplished by placing + or — cylindrical glasses before the eye in such a manner as to produce a greater obliquity of the retinal image, thus causing the weak oblique to act more than usual in binocular vision. In the treatment, either concave or convex cylinders can be used; if the concave are used, and the insufficiency is in the superior obliques, the axes must be placed in the lower nasal quadrant; if in the inferior obliques, then the axes must be placed in the lower temporal quadrant; while if the convex cylinders are chosen, the axes must be placed in the lower temporal quadrant for insufficiency of the superior obliques, and in the lower nasal quadrant for insufficiency of the inferior obliques. In either case the effect is increased as the axis is made to move from the vertical to the point of maximum effect, which is 45 degrees from the vertical. The exercise may be commenced with a .50 to a 1.00 D. cylinder, and increased each day a .50 up to 3.00 D. cylinder.

Jack, of Boston,⁹⁹ has seen a constant faulty position of the head and neck (the head being bent to the right and slightly twisted on its vertical axis in the same direction) disappear after tenotomy of the left superior and right inferior recti muscles. Meany, of Kentucky,²²⁴ says that "surgical interference for the correction of squint is a binocular proceeding, and should only be resorted to after a thorough study of the motility of each eye separately, and both as regards their relation and their reciprocal movements." In operating for the correction of strabismus, Lagleyze¹⁰⁶⁰ shortens the muscle without severing its point of insertion, by passing a suture through it and the external border of the conjunctiva, of which a crescent-shaped piece had been already removed. The closer the suture is tied, the greater is the effect upon the squint. The suture is cut twelve days after the operation. He reports nine cases in which this procedure had been successfully employed. Koller, of New York,³⁴⁷ finds that the subconjunctival injection of a few drops of a 1-per-cent. solution of cocaine, after anaesthetizing the conjunctiva with a 4-per-cent. solution of the drug, allows of the performance of tenotomy without producing the slightest pain. He claims that by pursuing the same method with a 4-per-cent. sterilized solution of the anaesthetic, cataract operations and iridectomies can be performed painlessly.

In preference to a free dissection of one muscle, Tiffany, of Kansas City,⁸⁵ advises a partial tenotomy of each muscle of the two eyes. Pomeroy, of New York,¹⁵⁶ has arrived at the conclusion that the effect of a tenotomy is almost certain to become less after a time than at first,—that is, what has been called a latent "insufficiency" of the weaker muscle,—and to meet this condition he is in the habit of doing more than simply overcoming the insufficiency. Pooley, of New York,⁴⁰ reports two cases of divergent strabismus successfully operated upon by the method described by Gruening. Chevallereau, of Paris,¹⁵² no longer resorts to advancement of the muscle, as he says that he has devised a simpler means to attain the same end. In convergent strabismus, for example, after section of the internal rectus, a needle is entered through the conjunctiva at the outer border of the cornea, and is brought out at the external angle. The thread is drawn upon and the cornea is turned outward. The eye is left in this position for two or three days, until the divided muscle forms adhesions in its new position.

The thread is made to pass through the sheath of the external rectus, or even through the muscle itself, in cases where the above method does not suffice.

According to Gruening, of New York,¹ "tenotomy of the recti externi muscles, with the addition of an adducting suture, generally proves sufficient for the correction of divergent strabismus." In performing the operation, the author incises the conjunctiva freely, so as to expose the whole extent of the tendon, and divides both externi at one sitting. If the divergence is not more than two millimetres, the division is made at the point of insertion; but if the squint measures more than this, then the tendons are divided at a distance from their insertion corresponding to the degree of the squint. The conjunctival wound is closed by a few interrupted sutures placed horizontally, and the eyes are then coupled strongly in convergence by a silk thread passed through the conjunctiva over both internal muscles, in a line with the horizontal meridian of the cornea, and tied over a pledget of cotton on the bridge of the nose. Howe, of Buffalo,³⁴⁷ claims that the loop made by Prince in his advancement operation permits the muscle to slip. To obviate this, and to do away with the conjunctival puckering which often remains after the operation, the author suggests passing the sutures as follows: A stitch is introduced at the same place and in the same manner as suggested by Prince, and then, being tied in the centre at the point nearest the cornea, the needle is again placed under the conjunctiva at that point, and this end of the thread is tied with the other end of the same suture. In order to draw the muscle forward, a suture is passed from the upper edge of the muscle and corresponding part of the conjunctiva through the upper part of the opening of the B-shaped loop. The lower stitch is passed in the same way through the lower edge of the muscle, and then through the lower portion of the loop. By tying the corresponding ends of these two stitches above and below, the muscle is brought securely into the position it should occupy, and there is no projection of the conjunctiva.

Fernandez, of Havana,⁴⁵⁹ has seen exophthalmos develop in a boy following a simple tenotomy of the internal rectus for the correction of an internal squint. The conjunctiva had been sutured after the muscle was divided. While recovering from the effects of the anæsthetic, the patient vomited violently, producing ecchy-

mosis of the conjunctiva and tumefaction of the lids. He complained of diplopia for some time after the operation. The local inflammation and the double vision disappeared after a few days. Two months after the operation exophthalmos developed and lasted eight years. In a second case of a similar nature, care was taken to detach the muscles from the capsule of Tenon. The eye recovered its normal position, but when the inflammation began to subside a slight exophthalmos was noticed. Four years later protrusion of the globe existed, but was less pronounced.

Van Millingen, of Constantinople,¹⁷¹ divides errors of convergence into: 1. Those of paresis of convergence, where all the elements of a perfect equilibrium, normal refraction and accommodation, and the sense of binocular vision still exist. He believes that a defect in the centres controlling convergence here acts as the causal factor. 2. Those of paresis of accommodation, monolateral or bilateral, without paresis of convergence. 3. Those in which, refraction and accommodation being intact and binocular vision suppressed, convergence is abolished. Here the desire to fuse being absent would indicate that conscious fixation originates in the visual cortical area and goes from there toward the centre of convergence. 4. Those in which, vision being abolished, voluntary convergence is preserved. This type he takes to be an indication that the centre for convergence is united to the cortical motor centres independently of the visual ones. In a comprehensive study of ocular palsies, congenital or developed in early life, Möbius³⁴ argues their dependence upon an infantile nuclear atrophy, and bases such diagnosis of these cases (1) upon the slow development of the paralysis, varying from a few months to many years; (2) upon the fact that the disorders remain stationary after they are once fully developed; and (3) upon the absence of systemic disorders. Heredity is an important factor in their causation, and the pathological condition is doubtless an atrophy of the ganglion-cells, then of the nerve-fibres, with a secondary involvement of the connective tissue and blood-vessels.

The accompanying cuts illustrate the appearance of the patient in Shaw and Barber's case¹⁵⁷ of ophthalmoplegia externa, occurring in a girl 2½ years of age. When first seen, there was bilateral ptosis, more marked on the left side, with paralysis of the left internal rectus; the left pupil became dilated and the iris reacted

sluggishly to light and accommodation. The pupils appeared fixedly dilated, and there was slight proptosis on the right side. Both internal recti and the levator palpebræ were paralyzed. The fundi were normal. Associated with the eye-symptoms there were



FIG. 1.



FIG. 2.
OPHTHALMOPLEGIA EXTERNA.
(*Brooklyn Medical Journal.*)

headaches, attacks of falling, *quasi petit mal*, glycosuria, and a stupor that gradually deepened until death occurred, about eight months from the first appearance of the illness. The authors believe the lesion to have been a slowly-advancing tumor in the

quadrigeminal region, which gradually compressed the fibres of the third nerve on their passage through the tegmentum and crusta. The details of a case of complete external ophthalmoplegia are given by Lagrange.⁷⁸⁰ The condition had existed as long as the patient could remember. The history threw no light upon the causation. The intrinsic muscles were unaffected. A recent double ptosis had caused the patient to seek relief. Nuel⁷⁷⁸ mentions a case of external ophthalmoplegia due to amyloid degeneration of the muscles.

Helfrich, of New York,⁷⁷⁶ reports a case of injury to the right eye, with *partial paralysis of all the extrinsic muscles* of the injured eye, and the complete paralysis of the same muscles in the uninjured eye. Both pupils were slightly contracted, the contraction increasing on exposure to the light and during convergence. An instance of paralysis of the external rectus muscle of the right eye, associated with slight paresis of both upper and lower extremities of the left side, in a young boy, has been seen by Dabney, of Louisville.²²⁴ There was a doubt whether a preceding attack of meningitis or a fall acted as the causal element. O. Bull, of Christiania,²⁴⁹ believes that "in the congenital and acquired cases of palsy of the different muscles we have a chain of symptoms which can be explained only by assuming an affection of the central paths through which the impulses are led to sets of muscles acting synergetically," and in proof of this statement he reports a series of cases, which he groups as follows: (1) "paresis of the side-turners and up-turners;" (2) "side-turners, up-turners, and the levator palpebræ;" (3) "congenital paralysis of the up-turners and the levator palpebræ;" (4) "paralysis of the out-turners and paresis of the side-turners;" (5) "paralysis of the out-turners with paresis of the side-turners."

DISEASES OF THE LIDS.

Bock, of Laibach,¹⁹⁰ has discovered the eggs of *pediculi capitis* on the eyelashes of a boy whose head was infested by them. Dève¹⁰⁰ has seen phthiriasis of the cilia in several cases, and believes it not so rare as is generally supposed. As a further confirmation of the frequency of phthiriasis of the lids, F. M. Chisolm, Baltimore,³⁴⁷ reports thirteen cases seen in the past year. Z. Julien¹⁷¹ mentions a case of pediculi in the lashes of a girl aged 17. A case of phthiriasis ciliorum of the pubic variety has been seen

by Allen, of New York,¹ in a woman 21 years of age. The pediculi were very numerous and difficult to detect. There were no subjective symptoms.

In a woman 78 years old, Theodor, of Bavaria,^{258 Sept.} has observed a *cutaneous horn*, about 5 centimetres long, growing from the upper right lid; it was first noticed by the patient a year previously as a small black wart, which for a while showed no tendency to enlarge. A case of *vaccine blepharitis*, in a boy 12 years of age, has occurred in the practice of C. Zimmermann, of Milwaukee.^{249 Apr.} When first seen, the right lower lid showed two ulcerating patches at the ciliary margin, close to the external canthus. A few days later the tarsal conjunctiva became infiltrated with a gray membranous exudate, accompanied by marked chemosis of the bulbar conjunctiva. He thinks that infection probably occurred from contact with a vaccine pustule on the arm of a sister. A case of accidental vaccinia of the eyelids, in a man 38 years of age, has been seen by Thompson, of Cardiff.^{6 July 22} The lids were oedematous and painful, their edges at both outer canthi exhibiting a purulent ulcer with indurated margins. Hirschberg, of Berlin,^{190 Jan.} reports a case of vaccination ulcer on the upper lid of a female adult, who was probably inoculated whilst washing her child, which had recently been vaccinated.

In a case of *congenital ptosis* operated upon by Evans, of Louisville, Ky.,²⁴⁷ after the method proposed by Panas, the improvement two years subsequently was so marked that the only disfigurement was a small pit under the brow where the slip of integument was passed through. Schnabl^{57 Mar. 18} reports a case of congenital ptosis where the lid before the operation could be raised but 6 millimetres; after the operative procedure it could be raised 14 millimetres. His method was as follows: At 1 centimetre's distance from each commissure two vertical incisions, about 2 centimetres long and 1.5 centimetres distant from each other, were made, extending from the lower border of the eyebrow to the tarsal edge. A horizontal cut along the tarsus and another intersecting the vertical incision were made, and the skin was excised. The edge of the flap between the two vertical incisions was then united to the tarsus. Birnbacher, of Graz,^{190 May} describes a new operation, which aims at the formation of a cicatricial connection between the frontalis muscle and the skin of the upper lid. A crescent-shaped

incision is made along the upper border of the cartilage, which is then exposed. Three double sutures are now passed through the cartilage and carried subcutaneously to the eyebrow. The middle suture is carried directly upward, the others slightly obliquely, and the needles of each double suture emerge in close proximity, as is seen in cut. The ends are tied over small iodoform rolls, and the wound in the lid is stitched.

Dunn, of Richmond, Va.,³⁴⁷ has seen a case of *recurrent œdema of the right upper lid*, associated with nasal polypi and myxomatous degeneration of both middle turbinated bones, more marked on the right side. Partial removal of the degenerated tissue was followed by a rapid subsidence of the lid-swelling. From a microscopical study, Weymann, St. Joseph, Mo.,¹⁰⁰⁷

concludes that: "1. *Chalazia* are not retention cysts, but true granulomata. 2. Their appearance in large numbers, and in successive periods, suggests a parasitic etiology. 3. Their ready reproduction after removal also points in that direction. 4. The growth of granulation tissue presupposes a long-continued irritation of a low grade. 5. A fungus can be demonstrated in chalazia. 6.

The 'fungus chalazicus' fully explains the etiology of the neoplasm, giving the *causa originis* of the local irritation and of the granuloma resulting therefrom. 7. Hordeola often preceding chalazia, and also having many characters pointing to their parasitic origin, might possibly be caused by the same fungus. 8. The *typical* chalazion must be considered a neoplasm due to parasitic causes; still, the possibility of a mere retention cyst cannot be denied, however rare such an occurrence might be." Ayres, of Cincinnati,³⁴⁷ has devised a small forceps to aid in expressing the contents of chalazia. Killen, of Birmingham, Ala.,¹ has devised a forceps for the extraction of chalazia, which consists of a fenestrated blade, to be introduced upon the conjunctival side of the tumor, and a flat-tipped blade, to be placed upon the skin side. During the opera-



NEW OPERATION FOR PTOSIS.
(Centralblatt für praktische Augenheilkunde.)

tion the lid is everted, thus forcing the growth through the *fenestra* and allowing easy removal. Stoewer, of Greifswald,³⁵³ described two *cysts*, of at least two years' growth, symmetrically situated in the upper lids. From the microscopical examination and by a process of exclusion, the author concludes that they originated from Krause's glands.

Eighteen *calculi* were removed by Burrows, of Salt Lake City,¹¹⁵ from the Meibomian glands of a miner aged 45 years. The concretions were of various sizes and shapes. In order to facilitate their removal it was found necessary to destroy the surrounding tissue with a mitigated stick of nitrate of silver.

Despaignet²⁴ has successfully treated a case of seemingly intractable *blepharitis* with bichloride of mercury in glycerin (1 to 20). E. Smith, of Detroit, Mich.,⁶¹ describes a new method of operating for *trichiasis*, *distichiasis*, and *entropion* of the upper lid. In the first two afflictions the operation consists in making an incision along the free border of the lid, extending a short distance beyond each extremity of the space occupied by the inverted hairs, and so placed as to separate the faulty from the normal cilia. The wound is made of sufficient depth to expose the hair-follicles, which are then destroyed by the cautery. In cases of mild entropion with slight incurvation of the cartilage, the author operates by raising a flap of skin and muscle from the tarsal cartilage over the convex or clubbed portion. The cartilage is "grooved" by drawing the cautery along its entire length. The flap is then returned to its proper place and sutured. In a case of trichiasis, in which one large bunch of cilia was inverted, Ray, of Louisville,²²⁴ has obtained eversion by splitting the free edge of the lid back of the offending lashes, and inserting a skin-flap into the gaping wound. Houlki Bey,²³² has cured a case of trichiasis in a 60-year-old woman by electrolytic treatment. Franke, of Hamburg,¹⁹⁰ prefers the pedicled skin-flap, as suggested by Thiersch-Eversbusch (ANNUAL, 1891, vol. iv, B-52), and claims that it is not necessary to lay the skin-flap first in the salt solution. Zirm, of Vienna,⁸ has cured congenital *distichiasis* of the lids by various modifications of Stellwag's operation. In such instances the position of the offending row of eyelashes was reversed by transposing a wedge-shaped flap containing the cilia into a more external position on the lid.

Believing that many use the term of *blepharospasm and photophobia* synonymously, Lopez, of Mexico,⁷⁷³ insists upon making a difference between them. He states that blepharospasm is the means that nature employs to check photophobia, and that it is always sympathetic to some point in connection with the fifth pair. A case of blepharospasm and entropion which resisted all other modes of treatment was cured by Vincent,²¹¹ by forming a temporary ectropium by means of sutures and section of the outer canthus, with whip-stitching of the conjunctiva.

Gifford, of Omaha,³⁴⁷ describes a modification of von Burow's operation for *entropium and trichiasis*. A cut parallel to the lid-margin, two to four millimetres from the openings of the Meibomian glands, through the tarsus, is made, and continued the length of the incurved portion of the lid. From each extremity of this incision a shorter one is made through the tarsus, slanting toward the neighboring commissure and ending between the cilia. The edge of the lid thus loosened is turned back by three or four sutures, passed first through the edge of the ciliary border and then out, and tied to a small cylinder of cotton. The gap is filled by a Thiersch skin-flap, or by a piece of lip-membrane applied without the use of stitches. McKeown, of Belfast,⁶ splits the free edge of the lid into two layers with a Graefe knife. The outer one, containing the skin and eyelashes, is made to glide upward so as to expose the cartilage of the lid to which it is sutured. The denuded surface on the lower layer is covered by a graft taken from behind the ear. In a case of traumatic entropion, Bistis²⁸² has filled in the gap with the conjunctiva of a rabbit. The graft took well and the entropion was cured.

Fukala, of Pilsen,²⁵⁴ has modified his operation²⁵⁴ for the cure of obstinate forms of blepharitis ulcerosa, by covering the wound in the cartilage with the skin of the lid. The skin is held in place by two to four sutures, passed in such a way that they cross the margin of the lid and bridge it over. In two cases of entropium and distichiasis, Hansell, of Philadelphia,⁹ has had satisfactory results following Pagenstecher's operation. Fromaget⁷⁰ details a case of cicatricial ectropion, following a burn, successfully treated by transplantation of skin taken from the antero-internal part of the arm. Hirschberg, of Berlin,¹⁹⁰ reports a plastic operation for the restoration of the eyelashes of the upper lid and

the cure of an ectropion. Directly above the line of the missing eyelashes a horizontal incision was made, extending from the inner to the outer angle of the eye. The margin of the upper lid was now united to that of the lower by passing two sutures through the cartilage. An incision was then made to the nasal side through the length of the eyebrow. A tongue-shaped flap was taken from the forehead, by which the deficiency of the upper lid was restored and the presence of the eyelashes secured. Castorani¹⁰⁶⁰ has had recovery from a cicatricial ectropion by means of autoplasty. The patient had been previously operated upon for the cure of the same affection, but the success of the primary operation had been marred by an abscess of the lachrymal gland. The author destroyed the gland with the cautery and, after cutting away all the cicatricial tissue, performed the above operation.

An instance of ectropion of both upper lids, resulting from disease of the roof of the orbit, in a negro boy, has been cited by H. Woods, of Baltimore.¹⁰⁴ The defect was corrected by operation. Vossius¹⁰⁶¹ has cured a case of ectropion of the lower lid by the operation suggested by Fukala. Douthwaite¹⁰⁶² transplanted the ciliary margin of the lower lid of a Corean slave upon the eye of his master, for correction of an ectropion. The success of the operation was marred by the accidental interference of the patient. Woodward, of Burlington, Vt.,¹⁰⁶³ has successfully performed skin-grafting, by the Thiersch method, for cicatricial deformity of the eyelids in two cases, one of lagophthalmus and one of ectropium. Barraza¹⁰⁶⁴ reports a case of restoration of the upper lid by transplantation, after the method suggested by Gradenigo and Landolt. The patient presented himself at the clinic with a tumor of the superior eyelid, which covered the inferior one. The skin, as well as the conjunctiva, was ulcerated. From the clinical history, and from microscopic examination, the growth was thought to be a sarcoma. The neoplasm, together with about three-fourths of the upper lid, was removed. The border of the lower lid was laid bare, and immediately sutured to the remaining portion of the upper one; in ten days the wound was healed. Twenty days later the lids were divided, and the skin of each lid was sutured to the conjunctiva. A few months after the tumor had disappeared and the patient could close his eye with great facility, while the marks of the operation could only be detected by careful scrutiny. In the

second case there was a complete cicatricial ectropion of the right upper lid. The author detached the ciliary edge of the lid from the superciliary region. The lower lid was denuded and both lids were sutured together. The raw surface which was left on the upper eyelid was covered with a flap, four by six centimetres, taken from the arm. The graft was sutured in position and an antiseptic

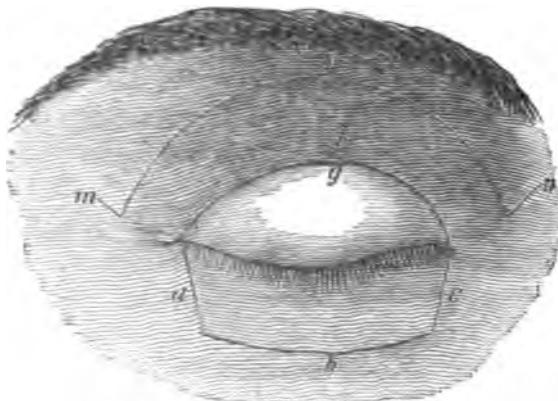


FIG. 1.

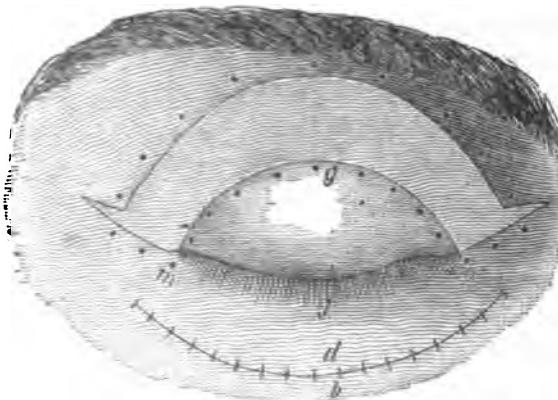


FIG. 2.
NEW OPERATION FOR BLEPHAROPLASTY.
(*Gaceta Médica de México.*)

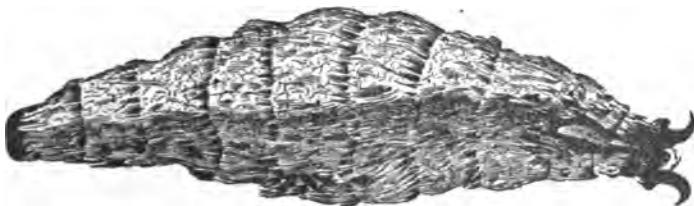
bandage applied. Recovery was complete. The new skin of the lid was soft, and there was no tendency to retraction.

The accompanying illustrations represent a new operation for blepharoplasty, by means of which Lopez, of Mexico,¹⁷⁹ obtained an excellent result in a case where the lower eyelid had been destroyed by inflammation, permitting of the exposure of the globe.

The affected tissue was first removed by the scissors. Two parallel incisions were made in the upper lid, the primary one along the superior margin of the cartilage, the second being about ten millimetres nearer the free border. These were united at the extremities by means of two small incisions. The flap thus formed was dissected off and lowered into the gap left by the removal of the diseased tissue, and its inferior margin sutured to the lower lid. The lids were then sewed together and a proper bandage applied. Goraud⁷⁸⁰ gives details of three cases of *elephantiasis of the upper lid*, in one of which both eyes were affected.

DISEASES OF THE CONJUNCTIVA.

F. M. Chisolm, of Baltimore, ¹⁰⁴_{Mar. 26} has seen a *piece of twig*, seven-eighths of an inch long and one-eighth of an inch in diameter,



LIVING LARVÆ IN CONJUNCTIVAL SAC.
(*Archives of Ophthalmology*.)

remain for four months in the conjunctival *cul-de-sac* of a 9-year-old child, who complained but little of local irritation. Shirley, of Winchester, ¹_{J.J.} reports the death of an infant from haemorrhage as a consequence of scarification of the conjunctiva, which had been employed as a means of treatment in purulent conjunctivitis. Phillips, of Philadelphia, ²⁴⁹_{N.S.1} reports a case of *living larvæ* which he found in the conjunctival sac of a young lad. The accompanying cut represents one of these animals magnified 75 diameters, which is considered by the author to be the product of some of the smaller dipterous insects. The presence of the parasites created considerable irritation and discharge, which subsided upon their removal. A case of *periodic congestion of the conjunctiva*, principally of the bulbar portion, was seen by Burnett, of Washington,

D. C.,²⁴⁸ in a married woman over 50 years of age. The attacks, which occurred during and after the climacteric period, were always preceded by some nervous disturbances,—usually coldness of the extremities and drowsiness, and were accompanied by a feeling of heat and flushing of the side of the head corresponding to the affected eye. The author attributes the cause to a disturbance of the vasomotor nervous system. Burnett²⁴⁹ has also seen a case of unilateral *chemosis* of the conjunctiva and lid, in a woman 32 years of age, apparently produced by the ingestion of 1 grain (0.065 gramme) of quinine. One year previously both eyes had become similarly affected after the internal administration of 4 grains (0.26 gramme) of the drug. Bertrand-Lauze²⁵⁰, considers that the appearance of inflammatory or non-inflammatory chemosis indicates a certain degree of gravity, and that the surgical treatment—scarification, puncture, or incision—gives only temporary and relative results. Considering chemosis analogous to ascites in peritonitis, the author, relies upon medical treatment, and believes that quinine and digitalis are indicated, in addition to derivation by the bowels. Hot compresses and astringent lotions, followed by cold applications, also have a certain value.

Lopez, of Mexico,²⁵¹ has seen a *cyst of the conjunctiva* develop where there had been great damage to the bony frame-work of the orbit and to the orbital tissues, as the result of a traumatism. The cyst was of such an enormous size that the globe was completely obscured. According to the statement of the patient, the eyeball was uninjured at the time of the accident, but a violent inflammation set in, which caused the lids to become very stiff. Extirpation of the external wall of the cyst, which consisted of the palpebral conjunctiva and the fornix, with its external surfaces adherent to the neighboring tissues, revealed the presence of three fragments of bone. A transparent yellowish liquid oozed out of the wound, which the author considered to be nothing more than the lachrymal fluid. The posterior wall of the cyst consisted of the cornea and of the bulbar conjunctiva. The former was perfectly transparent, the iris and pupils being visible. The sclerotic could be seen through the conjunctiva. The globe had been pushed by compression into the interior of the orbit and remained motionless, presenting the phenomenon of upward strabismus. The internal surface of the cyst was entirely smooth, being covered by epi-

thelium, which rested upon a more or less homogeneous membrane of moderate thickness, while the wall proper of the cyst, of remarkable thickness, consisted of a very dense net-work of conjunctival tissue, in which the fibrous element predominated. Cellular tissue was very scarce, and only a few blood-vessels were noticeable. Toward the exterior the walls of the cyst were continuous with the neighboring tissues, without any distinct line of demarkation between them. There was some adipose tissue and torn muscular fibres. The author believes that the traumatism produced a tearing of the mucous membrane; that both conjunctivæ, being lacerated near their edges, grew together, and formed a closed cavity lined by the kerato-conjunctival epithelium. The tears filling this sac soon enlarged it; the epithelial lining, being compressed, becoming smoother and thicker. In a word, the author states that the cyst may be regarded as being simply one of retention.

A case of *hard chancre* on the ocular side of the lower lid has been recorded by Purtscher, of Klagenfurt.¹⁹⁰ The mother of the patient belonged to a class of individuals who practice licking the eye with the tongue for the cure of eye diseases, and, as the patient admitted that her mother had done this for her, it was probable that infection took place in this manner. Pischl, of San Francisco,¹⁹¹ cites an instance of syphilitic ulceration of the bulbar and tarsal conjunctivæ in a boy aged 19 years. The patient previously had suffered with phlegmonous dacryocystitis. A syphilitic gumma of the conjunctiva, occurring in a colored woman aged 20 years, has been seen by Minor, of Memphis.¹⁹² Trapeznikoff¹⁹³ gives the details of an interesting case of conjunctivitis due to a mucous patch. Ptosis, iritis, and anterior capsular cataract were further complications of the same case. The ulceration disappeared under specific treatment. Faguet¹⁹⁴ reports a case of gumma of the conjunctiva in a pregnant woman cured by specific treatment. Lagrange has seen, in a woman aged 50 years, an infiltration of the internal ocular conjunctiva of the left eye three months after the primary lesion, which disappeared only after long treatment. A case of mucous patch of the conjunctiva has been seen by Barnes, of Milwaukee,¹⁹⁵ in a man who presented similar lesions on the buccal and pharyngeal surfaces. The affection spread from the tarsal to the bulbar conjunctiva, and healed with the formation of a symblepharon.

Steinbückel, of Vienna,⁸ gives the following statistics in relation to *ocular inflammation in the newborn*. Of the children of 7 women infected with gonorrhœa, 8.56 per cent. had inflammation of the eyes; in 313 newborn babes, 4.15 per cent. had ocular inflammations; of 5994 born during a period of two years, only 1.75 per cent. had an acute purulent inflammation of the conjunctiva. This low percentage is attributed by the author to the Credé prophylactic treatment. Laurent²¹¹ believes that the unusual proportion of blindness among the Arabs in Algeria is due to many infants being born with purulent conjunctivitis, which receives no treatment. The committee appointed by the medical and chirurgical faculty of Maryland in April, 1891, to devise means for lessening the amount of blindness from curable diseases, of which H. Woods, Baltimore,¹⁰⁴ was chairman, has issued a circular letter to midwives, in which they are recommended (1) to wash the eyes of the newly-born (as described); (2) to instruct the mothers whom they may attend concerning the importance of watching the eyes closely during the first and second weeks; (3) to call attention to the dangers of the disease, and the great urgency of prompt medical treatment. Smith⁶⁴⁷ also writes upon the prophylaxis, treatment, and prognosis of ophthalmia neonatorum. Pohlman, of Buffalo,¹⁷⁰ has produced acute conjunctivitis by mere dryness of the air, independent of heat, and concludes that "if repeated experiments finally develop the fact that heat has no effect upon the conjunctiva, then we have to modify our teachings regarding the well-being of our eyes under artificial illumination, and name, as the three factors necessary, whiteness and steadiness of the light, and moisture in the air surrounding the flame proportionate to its temperature."

In a lecture delivered before obstetrical nurses, Veasey, of Philadelphia,¹⁹, gave the following instructions: "1. Before making a vaginal examination, always cleanse the hands thoroughly with soap and warm water, followed by some antiseptic solution, taking care not to forget the finger-nails. 2. During labor, assist the eyes to pass rapidly over the perineum. 3. Always cleanse the eyes of the infant. 4. Do not use the same water for bathing the face and eyes with which the body has been bathed, and always use different sponges or pieces of flannel. 5. Never employ one towel for two persons; let everybody have his own.

6. Be careful not to allow any soap or bay-rum to enter the eyes.
7. Keep the light in the lying-in chamber very dim, or have it shaded with some dark material, green being the least trying and the most restful to the eyes.
8. Always burn *immediately* everything that has come in contact with the ophthalmic discharge.
9. Instruct the laity, whenever the opportunity presents itself, of the great danger of ocular affections of the newborn, and the necessity of consulting a physician as soon as they are discovered. And to the members of the profession present I would add:
10. Always use the Credé, Hégar-Kohrn, or some such method of cleansing and stimulating the eyes of a newborn infant."

Makrocki, of Potsdam, ⁶⁹ May 29; June 2, recommends the use of eserine in *corneal ulcers complicating blennorrhœa neonatorum*, and claims that it not only checks ulceration, but also causes almost complete absorption of thick leucomata. The primary disease he treats with astringents, and, if necessary, the mitigated pencil of nitrate of silver, conjoined with the use of warm fomentations. He also recommends the aqua chlorata, in strength of 1 to 3, not so much for its disinfecting powers as for the sake of obtaining thorough cleanliness. In conclusion, he gives the clinical history of five cases, which he claims go to confirm his views. Kenneth Scott ⁷⁶ Apr. prevents *ectropion of the lids*, as the result of purulent ophthalmia in infants, by passing a moderately thick silver-wire suture from the eyebrow downward through the substance of the lid. The needle is then carried upward parallel to the first suture, and brought out 4 millimetres from the entering-point. No traction is made, but the lid is molded into its proper shape by bending the wire. In the treatment of ophthalmia neonatorum, Smith, of Chattanooga, ⁸¹ employs a wash of boracic acid, the local application of cold to the eye by means of iced linen compresses, and a suitable solution of nitrate of silver.

Stephenson, of London, ⁷⁶ gives a description of the *cicatricial changes in the conjunctiva* resulting from ophthalmia neonatorum. He distinguishes two classes, a typical and an atypical. In the first, a thin bluish-white scar is seen covering the entire conjunctival surface of the lower lid and of the superior fornix, the rest of the upper lid being unaffected. The cicatrices in the lower lid run in crescentic lines, following the contour of the lid, but this arrangement is usually absent in the upper fornix. In many cases

a fairly characteristic minute projecting fold is present at the junction of the fornix and tarsus of the upper lid. In the second class there are multifarious forms, the most usual being dense, white scarings of the upper and lower lid.

Parker and Bloodgood, of Philadelphia,¹¹² report an instance of purulent ophthalmia, in a child 5½ years of age suffering from vaginitis, which, according to the authors, was of interest from the nature of the ocular inflammation, which assumed a diphtheritic type, and from the rarity of such a source of infection in so young a subject. Brisken, of Halle,³⁴ advocates the prophylactic treatment of ophthalmia neonatorum, as suggested by Kaltenbach, but makes use of Credé's method in all cases where the woman has not been under observation from the time of the first pains. Schneideman, of Philadelphia,¹¹⁴ employs a solution of bichloride of mercury (1 to 2000) for washing the conjunctival sac, and applies nitrate of silver, in strength varying from 10 to 40 grains to the ounce, once or twice a day. F. T. Smith, of Chattanooga,¹²⁰ employs boracic acid and nitrate of silver, and says that the application of heat must be avoided, as it favors the propagation of the cocci. He applies cold, in the form of compresses. Edsall, of Pittsburgh,¹⁶¹ advises that we do not temporize with placebos of boracic acid or similar preparations, but that in addition to these—which should be used for cleansing purposes—we should apply strong nitrate-of-silver solutions until the discharge has become thin, and then employ weak solutions of the same drug until the disease has ceased. A comparison of the results obtained from the treatment by scarification and the application of strong solutions of nitrate of silver, with those secured by milder methods, has strongly impressed Campbell, of Detroit, Mich.,¹⁸⁵ with the superiority of the latter means.

Dunn, of Richmond, Va.,⁸¹ cautions against the careless use of nitrate of silver in the treatment of the disease without complications. He holds that without proper care the drug is capable of producing ulceration of the cornea. Weymann, of St. Joseph, Mo.,²⁷⁹ considers the use of antiseptic washes unjustifiable, as he has found them to be too irritating. Cheney, of Boston,⁹⁹ considers it of the utmost importance to make daily applications of a solution of nitrate of silver, 1- to 2-per-cent. strength, to the palpebral conjunctiva, as long as the lids remain infiltrated and there is the least purulent discharge.

A case of *gonorrhœal conjunctivitis* is reported by Morton, of Minneapolis,¹⁰⁰⁷ July in which the disease occurred in an orbit containing a shrunken ball, over which an artificial eye was being worn. An attack of delirium tremens, which the author thinks was probably excited by reflex irritation from the gonorrhœal disease, developed on the second day.

Trousseau¹⁰⁰ treats the same affection with a 3-per-cent. solution of nitrate of silver, applied twice daily, combined with frequent washings and cold compresses of a 1-to-2000 bichloride solution. When the cornea is involved, he says that eserine should be instilled two or three times daily, and if the ulcers be deep he advises the application of the actual cautery. He believes that in no case should the active treatment of the disease be abandoned.

Hirst, of Philadelphia,¹⁴⁴ condemns the use of too strong solutions of nitrate of silver, on the ground that they may lead to fatal conjunctival haemorrhage. Galtier, of Nimes,¹⁷¹ June protects the cornea from the action of strong solutions of silver nitrate in the treatment of gonorrhœal ophthalmia by fitting over it a nickel cap, held in place by an assistant. The caps are of different sizes, the object being to have them overlap the corneo-scleral junction at the time of the application of the remedy.

A case of gonorrhœal ophthalmia with formation of false membrane has been seen by Dunn, of Richmond.⁸¹ Sloughing of the cornea, with prolapse of the iris and subsequent sympathetic irritation, led to the enucleation of the eye. Belt, of Washington, D. C.,¹⁰⁴ July, reports a case of symmetrical corneal ulcers following gonorrhœal ophthalmia in a woman 22 years of age. Four weeks after the beginning of the attack, when the discharge had been arrested and an ulcer which had formed in the left eye had healed, a deep, clear, ulcerated surface in each eye suddenly appeared, which extended horizontally across each cornea.

Three cases of conjunctivitis differing from the gonorrhœal form of the disease have been observed by Parinaud, of Paris.¹⁷¹ The principal points of difference were that they presented less chemosis and less secretion, with no tendency to corneal ulceration or perforation. The author believes this form of conjunctivitis to be due to streptococci, which were habitually found in or about the lachrymal sac. Serous iritis was a further complication. The treatment consisted in instillations of bichloride of mercury (1 to 1000),

in association with the proper treatment for iritis, should this complication exist. Wallace, of Philadelphia,¹¹² emphasizes the close relationship existing between phlyctenular diseases of the cornea and conjunctiva and general malnutrition. From a study of the statistics of conjunctivitis phlyctenulosa, Fukala, of Pilsen,²⁵⁴ concludes that the disease is less prevalent in America than in Europe. This he attributes to the better hygienic condition of the lower classes in the former country. Dowling, of Cincinnati,⁵³ believes that a simple conjunctivitis, occurring in a lymphatic or scrofulous subject, may, under mal-hygienic conditions, develop into the genuine granular type of the disease. For this reason, he invariably associates general therapy with the local treatment. *Syndectomy*, in the treatment of keratitis and phlyctenular pannus, is advised by Verrey.¹⁷¹ He rarely excises any of the conjunctiva, but depends upon its retraction, and is careful to dissect down to the sclera, or even through it, in order to cut as many vessels as possible. He prefers the knife to the cautery, and claims that the local bleeding is an advantage.

Couétoux¹⁷¹ considers many affections of the conjunctiva and corneal epithelium as of purely naso-pharyngeal origin, and treats them by the curette, aided by antisepsis of the naso-pharynx. As characteristics of ocular affections of nasal origin, he gives periodicity and the superficial character of the corneal lesion. In the treatment of *pannus*, Vignes¹⁷³ has used antipyrin with great success, confirming the good results obtained by Aldar and Merge. The author states that, as the insufflations are painful, cocaine should be used at first, and applications made daily or every third day, according to the gravity of the case and the effect desired. The violent reaction that follows should, he thinks, be treated by frequently-changed, hot antiseptic compresses. This method is not applicable to symptomatic pannus, in which the primary condition should be first remedied. A. Bourgeois, of Reims,⁵⁷⁷ avoids caustics in the treatment of croupous, diphtheritic, phlyctenular, follicular, and granular conjunctivitis. In the diphtheritic form he uses carbolic acid, whilst nasal douches of boric acid (4 to 100) are advised in the phlyctenular and granular varieties. Kain and Gerke⁸ have been able to produce croupous conjunctivitis in two dogs and two patients inoculated with a pure culture of bacilli that had been taken from a case of the same nature.

Fernandez, of Havana,⁴⁵⁰ reports a case of *diphtheritic conjunctivitis*, occurring in a man 24 years old. When first seen, the eye did not present symptoms other than those of simple catarrhal conjunctivitis. There was slight injection of the bulbar conjunctiva and some oedema of the lids. Although the secretion was not of a true mucous or catarrhal character, but more muco-purulent, the author thought he had to do with a catarrhal conjunctivitis. The next day the secretion was distinctly purulent, the lids felt painful, and were hard and œdematos over the whole surface. The bulbar conjunctiva presented the same injected appearance, but the palpebral portion was covered with a thin white membrane. The conjunctiva was washed with a solution of potassium permanganate (1 to 5000), and was cauterized with a 2.5-per-cent. solution of nitrate of silver. During the following days the infiltration increased, but never spread entirely over the whole conjunctiva. The cornea also became infected, the inflammatory membrane attacking its centre. Persistence in the local applications, combined with a tonic treatment, soon caused entire disappearance of the false membranes. The author concludes that: 1. There is no reason not to consider as diphtheritic a case of conjunctivitis presenting false membrane. 2. That this form of conjunctivitis can present a more or less grave diphtheritic character, and a relative benignity should not authorize the exclusion of this disease from the diagnosis. 3. That, in cases of conjunctivitis showing the formation of false membrane the treatment should be most active. 4. That the detection of the microbe is the only method of making a sure diagnosis, and that the general system may become infected from the local nidus.

Aycart, of Madrid,⁴⁵¹ calls attention to the fact that syndectomy is a form of antiphlogistic treatment of great value in all ocular affections resulting from stasis of the lymphatic system of the conjunctiva or cornea, or from the abnormal development of blood-vessels in the corneal tissue. He states that the operation is indicated in (1) serous, phlegmonous chemosis of the conjunctiva, attended with periorbital pains and cloudiness of the cornea; (2) circumscribed, superficial, vascular keratitis, or phlyctenular keratitis, where the symptoms will not yield to cocaine or atropine; (3) diffuse, superficial, vascular keratitis, or pannus of

the cornea, in every stage and variety; (4) sclerosis of the cornea; (5) interstitial keratitis in its stage of vascularization; (6) corneal abscesses, resulting from local corneal or conjunctival inflammation which has not gone on to hypopyon formation; (7) asthenic ulcers of the cornea, coincident with active conjunctival hyperæmia. Woods, of Baltimore,¹⁶²⁰ gives the notes of two cases of diphtheritic conjunctivitis, in which microscopic examination of the false membrane failed to show the presence of the bacillus of Loeffler. The author considers the following propositions concerning pseudomembranous conjunctivitis justifiable: "1. There are two varieties,—one of the same nature as primary diphtheria, the other apparently a sequel of many and widely different pathologic conditions having no relation to diphtheria. 'Plastic conjunctivitis' seems the most appropriate term for the latter variety. 2. The classical distinction between diphtheritic and membranous conjunctivitis, based upon the presence or absence of infiltration in the tissues of the lids and ocular conjunctiva, is inadequate. 3. The only absolute proof of the diphtheritic nature of a pseudomembranous conjunctivitis is the demonstration of the Loeffler bacillus, or, later, the occurrence of paralysis, or some other sequel of diphtheria. Clinically, the presence of constitutional symptoms is essential to such a diagnosis. 4. The cause of the pseudomembrane in plastic conjunctivitis is not certainly known, and it is probably not always the same. In some cases, at least, there seems good reason to attribute it to the invasion of streptococci, an infectious disease, catarrhal conjunctivitis, traumatism, scrofulous habit, or some other influence, lowering the resistance of the tissues and paving the way for infection. 5. Plastic conjunctivitis may be more dangerous to the eye than a pseudomembranous inflammation 'undoubtedly diphtheritic,' experience showing that the danger is in direct ratio to the degree of lid and conjunctival infiltration."

Russel, of California,¹⁷⁷ insists upon the necessity of diagnosing between granular and follicular conjunctivitis, so that cases of the latter may not be infected by the former by being treated with the same instruments. Viger, of Mecheria, Algiers,¹⁷¹ writing of granular conjunctivitis as it occurs in that country, says that the disease appears under two principal forms: the lymphoid, rare among infants, common in adults, in which the granulations are

fused into a continuous layer in the submucous tissue, and a second, in which the granulations are distinct and separated by healthy tissue. The latter prevails among children. In the acute forms, occurring in children, dilute collyria of acetate of lead are used, while in the more chronic variety, whether the granulations be distinct or diffuse, the author prefers the surgical treatment as suggested by Darier. He cites five cases treated by this method, in which there were three complete cures in fifteen days and promising improvement in the other two. Differing from Darier, the author believes that canthoplasty is unwise in children, and even in adults, and that it should be reserved for special cases. From his experience with the treatment of trachoma, Weeks, of New York,⁶¹ has been led to the following conclusions: "(a) In the first stage of trachoma the most efficient mode of surgical interference is that of expression, combined with superficial scarification and the introduction of a germicide by the use of a brush. (b) In the second stage, where surgical interference is advisable, the treatment known as 'grattage' should be combined with expression in some cases. Canthotomy or canthoplasty, if necessary, gives the most satisfactory results. (c) The operations, as above advised, convert a contagious into a non-contagious condition, and the patient may be admitted to wards for ordinary surgical cases without fear of infection." In an article upon the frequency of different forms of ocular disease occurring in the city of Mexico, Chacon¹⁷⁹ states that trachoma is very rare. The hygienic conditions of the lower classes being of the very worst, the author asserts that it is the altitude of the city that renders it free from this pernicious disease. He thinks that race has nothing to do with the question, as there are many foreigners living in the city who are alike free from any visitation of the inflammation. According to the author's statistics, phlyctenular conjunctivitis is common (12 to 13 per cent). The other forms of conjunctivitis are also common, being observed at all ages and in both sexes. Bendell²¹⁶ considers that trachoma results from a want of proper sanitation, and believes that its appearance endemically is due to contagious influences.

By treating the disease with massage and bichloride of mercury (1 to 2000) von Hippel, of Königsberg,⁶⁰ reports that, of a series of 450 cases, the milder forms were cured, while the severer ones were at least relieved. Excision of the diseased conjunctiva was

necessary in but 3 cases. The time required was from two weeks to three months. The more recent the case, the quicker was the cure. In the first 100 cases there was a recidivity of 15 per cent. He claims that massage causes the absorption of the inflammatory exudate around the follicles, and that the sublimate exerts an immediate antiseptic action beneath the broken epithelium. Secondi,⁴¹ deems the best treatment to be the curetting and expression of the diseased tissue by means of strong metallic forceps. Long, of Topeka,¹⁹² has had gratifying results with an ointment of non-alcoholic extract of *thuja occidentalis*, in the strength of 1 drachm to 3 drachms (3.88 to 11.66 grammes) of vaselin. Chevaliereau, of Paris,¹⁵² has used friction, by means of a piece of rough linen dipped in bichloride-of-mercury solution (1 to 500); this procedure is repeated twice a week.

In cases of the disease with swollen conjunctiva and considerable mucous discharge, Chase, of Denver,¹⁵⁵ advises the use of a solution of nitrate of silver (5 grains to 1 ounce—0.32 to 31 grammes). If there is a tendency to haemorrhage, he uses yellow oxide of mercury. If there are true sago granulations, the crystal of sulphate of copper gives the most satisfaction. In children, Jacob, of Dublin,²² advocates fresh air and the proper local, conjoined with vigorous tonic, measures. Strangways¹⁰⁰⁷ states that, to carry out Hotz's method, it is absolutely necessary for the surgeon to know how to expose the whole of the upper *cul-de-sac* without using instruments. The method pursued by this author, as described by the writer, consists in "first evert the lid in the usual way, then drawing the everted lid upward with one thumb, while the other exerts firm backward pressure on the eye through the lower lid." Fukala, of Pilzen,⁵⁷, recommends a slight modification of Jaesche's method²⁵⁴ as the quickest, simplest, and most scientific method. Claiborne, of New York,⁸¹, prefers expression to grattage. Cersetos¹⁵² employs the method of Darier. Williams, of St. Louis¹⁰⁹ has treated ten cases successfully by the same method.

Keller, of Louisville,¹⁵⁵, claims that the most satisfactory agent in the treatment of the disease with pannus is "nitrate of silver, applied in substance to the granulations and in solution (40 grains to 1 ounce of water—2.59 to 31 grammes) to the cornea." He directs that the crayon be applied "edgewise," so as not to destroy the healthy portions of the conjunctiva between the papillæ. The

cornea and lids are to be bathed thoroughly with a saturated solution of salt after application of the silver solution. Dujardin, of Lille,²²⁰ recommends the use of strong solutions of bichloride of mercury, alone or combined with the brushing method. The production of an artificial purulent conjunctivitis, by jequirity or the inoculation of gonorrhœal matter, he still believes to be the best remedy in certain cases. Williams, of St. Louis,¹⁰⁰ has had great satisfaction from the use of grattage. Comer, of Trinity, Tex.,¹⁰⁹ considers the method by "brushing" to be a specific. Baldinger, of Galveston,¹⁴⁹ believes that expression of the granulations is the only rational method. Truc, of Montpellier,³ insists that a general therapy is nearly always indicated, and that the local condition requires various modes of treatment. In cases which need brushing, he differs from Abadie in employing but local anæsthesia, and omits the division of the canthus. From personal experience, Fox, of Philadelphia,¹⁰⁰⁷ has found von Burow's operation a valuable addendum to that now known as the grattage method. Pooley^{100,15} expresses the contents of the granulations with the finger and thumb-nail. In the conjunctival angles he finds it advantageous to employ forceps. After the expression is completed, a crayon of cupric sulphate is applied to the membrane, any resulting inflammation being combated by ice compresses. Jackson, of Philadelphia,¹⁹ states that the amount of benefit obtained from the expression method is, in general, proportioned to the quantity of exudate in and beneath the conjunctiva; where there had been a considerable amount of exudation, he has found the cure immediate and apparently permanent. Tiffany, of Missouri,⁷² has had very favorable results from the use of Knapp's forceps. H. Woods, of Baltimore,¹⁰⁴ reports six cases successfully treated by expression with these forceps. He concludes¹⁰⁴ that it is the best method ever devised for treating the disease.

Venneman, of Louvain,²⁷⁴ has seen certain *peculiar hyaline bodies* in sections of a granular conjunctiva, in an inflamed conjunctiva of an entropion, and in the border of an ulcer, probably tubercular. The hyaline bodies were found in the free cells infiltrating the connective tissue of the conjunctiva; rarely in the migratory cells invading the thickened epithelium. They were usually small and numerous, filling the large spheroidal or ovoidal

cells, though sometimes large and solitary, when they occupied the entire protoplasm of a round-cell. The writer thinks that the bodies are derived from the plasma-cells, whilst the large ones are derived directly from the protoplasm of the round-cells.

From a further experience with *xerosis of the conjunctiva*, Kollock, of Charleston,⁸⁰ has found that it is, at times, associated with granulations, but that these rarely extend below the retro-tarsal fold. He has also seen the ulceration of the cornea result in perforation. Wolff, of Vienna,³⁵³ has seen a *tumor of the caruncle* of dermoidal and lipomatous character. As shown in the sketch, the growth was composed of two parts, one involving the plica semilunaris, the other situated on the sclerotic, near the inner

inferior margin of the cornea. Lagrange²⁵ says that *epithelioma of the bulbar conjunctiva*, in its incipient stages, may present itself under the form of phlyctenular inflammation, with chronic episcleritis. It has then a warty form, and its volume is small; but as it increases it shows a tendency to become pedunculated, and is always solitary. Glandular involvement, though met with, is rare. He believes that, in its later stages, it must be diagnosed from pinguecula and the dermo-epithelioma of Parinaud. The treatment

consists in the prompt extirpation of the growth. If the cornea is involved, ablation of the anterior segment or enucleation should be performed.

Weymann, of St. Joseph, Mo.,¹⁰⁰⁷ has removed a fibrolipoma from the bulbar conjunctiva of a child 6 years of age. Study with the microscope showed that the fat-tissue occupied the middle of the growth, and especially the part directly in contact with the sclerotic. The fibrous portion of the structure comprised more than two-thirds of the entire mass, whilst the disposition of its component bands and bundles corresponded with the long axis of the tumor. Minor, of Memphis,¹⁰¹⁸ has seen an unusual form of polypoid tumor of the caruncle in a child 7 years of age. The



DERMOID TUMOR OF CARUNCLE.
(Klinische Monatsblätter für Augenheilkunde.)

growth contained a small pus-cavity which communicated with the lachrymal duct. Microscopic examination showed the tumor to consist of granulation tissue. A case of *melanosarcoma of the anterior portion of the eyeball* has been seen by Pooley, of New York.⁵¹ The tumor began close to the caruncle and extended in the direction of the conjunctival *cul-de-sac*. A second smaller, non-pigmented neoplasm was situated upon the lower sclero-corneal margin. The growths were removed, with preservation of the eye. From a study based upon the microscopic examination of fifty cases of *pterygium*, Fuchs, of Vienna,²⁰⁴ points out that the name of pterygium has been applied to two different conditions: the true form, where the growth is situated on the inner and outer side of the cornea, and is unaccompanied by signs of inflammation; and the false form, in which the growth may be situated at any peripheral part of the cornea, its formation being always inflammatory, an injury causing a loss of epithelium being usually the site to which the conjunctiva becomes attached. True pterygium is always developed from a previously existing pinguecula by an invasion by this latter of the corneal limbus in the form of a zone of progressive infiltration. The pinguecula gradually loses its characteristics, the yellow nodules disappear, and the advancing zone becomes of a grayish, brownish hue, is devoid of blood-vessels, and has a jagged edge. The ultimate size, form, and direction of the growth is decided by the way it advances across the cornea. The invasion of the cornea by the pterygium is explained hypothetically by assuming that the presence of the pinguecula interferes with its nutrition by causing a diminution in its blood-supply.

In operating for pterygium, Keyser, of Philadelphia,¹⁹ tears the growth from its corneal attachment, and, after splitting it, sutures each half to the conjunctiva. Malgat¹⁷³ reports a unique case of quadruple pterygium of both eyes in a boy 16 years old, who had exhibited this condition from infancy. They occupied the position of the recti muscles, but were entirely independent of them. They were removed successfully, one in each eye at a sitting, and time allowed for the conjunctiva to heal. Hotz, of Chicago,⁶¹ has experimented with Thiersch's grafts, in the operation for pterygium, in three cases. He dissected the growth from the cornea and carefully divided the fibres which bound it to the

sclera. After this was accomplished a skin-graft, somewhat smaller than the denuded area, was introduced. Ultimately the graft became smooth and shining, and remained a little higher than the ocular conjunctiva. The author concludes that "Thiersch's skin-grafts readily adhere to wounds on the eyeball, that they may be utilized in patching up defects in the ocular conjunctiva, and that the insertion of a Thiersch graft may prove a valuable means to make the operation of pterygium a permanent success.

In cases where corneal incision is indicated and where pterygium exists, Würdemann, of Milwaukee,¹⁰¹⁸ considers the dangers of infection too great to warrant such a procedure without first disposing of the growth. By transplanting a strip of the conjunctiva of a rabbit into a socket, the former seat of a symblepharon, Cassar, of Malta,⁵⁸⁹ _{Sept. 16} has prepared the orbit for the reception of an artificial eye. After the operation the patient could impart some motion to the shell.

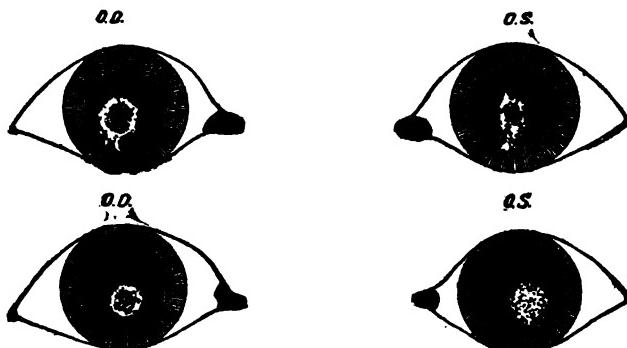
Fernandez, of Havana,⁴⁵⁹ gives the history of sixteen cases where intense ocular symptoms were caused by local contact with the juice of *Euphorbia antiquorum*, a plant commonly called cardon. In all of these instances one drop of the juice caused intense pain as soon as it came in contact with the eye. Photophobia and intense lachrymation were also very much marked. The conjunctiva became instantly much injected, and in some instances white patches were formed, showing the strong escharotic action of the plant. The cornea was affected in nearly every instance, becoming more or less opaque in one or all of its layers; at times circumscribed, at times diffuse. Local sedatives succeeded in relieving the symptoms, but, as nearly all the cases escaped from observation before the end of the treatment, the ultimate results could not be learned.

DISEASES OF THE CORNEA AND SCLEROTIC.

In the treatment of *traumatic abrasions of the cornea*, de Beck, of Cincinnati,⁴²⁶ after thoroughly cocainizing the eye, scrapes the ulcer and applies to its floor a solution of bichloride of mercury (1 grain to $\frac{1}{2}$ ounce—0.065 to 15 grammes). If the case has advanced to the formation of hypopyon he thinks it generally best to thoroughly scrape the ulcer and then to perform a free paracentesis. Simon, of Berlin,¹⁹⁰ reports a case of tumor of the cornea which had developed in scar-tissue, the result of a lime-burn. Micro-

scopical examination proved the growth to be principally a fibroma which had, in a measure, undergone myxomatous degeneration. The membrane of Descemet was found to be split into two layers on the nasal side. The author suggests that this may be of evidence in proving the laminated structure of this membrane.

Oliver, of Philadelphia,³⁴⁷ has seen two cases of symmetrically-placed *opacities of the cornea*, occurring in mother and son. The boy was 8 years of age, and presented in each cornea (as shown in lower portion of figure) a central macula surrounded by a ring of superficial pin-point opacities. These had been observed for a long time, but one year previously had enlarged, following an attack of malarial fever. Laveran's corpuscles could not be



SYMMETRICALLY-PLACED OPACITIES OF THE CORNEA.

The upper figures represent the appearances presented by the eyes of the mother, the lower those of the son. The pupils are represented as dilated, in order to give the configuration of the opacities against a dark background as clearly as possible.
(Ophthalmic Review.)

detected and there was no evidence of congenital syphilis. Examination of the mother's eyes showed similar opacities in each cornea, which had been present as long as she could remember. These are shown in the upper portion of the figure.

In reviewing the question of the relation of *keratitis dendritica* and *keratitis herpetica*, Haltenhoff¹⁷¹ details seven cases, in none of which was there any associated cutaneous herpes. Febrile symptoms existed in three. He believes in the infectious origin of the disease, but leaves open the question as to the independent nature of the dendritic form. Straub, of Utrecht,³⁴⁸ experimenting with the exudate of *scrofulous keratitis*, found a coccus colored by Gram's method, liquefying in gelatin and producing keratitis in rabbits, which he believes to be *staphylococcus pyogenes*. In the

treatment of *phlyctenular keratitis* complicated by pannus, Verrey¹⁵⁷ claims that kerotomy will work a cure more rapidly and more certainly, and that the absorption of the exudate is more complete than in other methods. Tiffany, of Kansas City,³⁵⁰ has successfully treated a case with methyl-violet. In two cases of tumor of the eyeball, of traumatic origin, decided reduction in size followed the injection of the drug into the growth.

In a case of recurrent *keratitis superficialis punctata*, seen by Bronner, of Bradford,²¹¹ in a man 48 years of age, the use of cocaine caused an increase in the severity and duration of the attack. Colburn, of Chicago,⁶¹ records two cases of *keratitis bullosa*. The first was seen in an otherwise healthy eye. A cure was seemingly effected by opening the sac, thoroughly removing the pellicle, and applying a 4-per-cent. solution of nitrate of silver. The second case occurred in a glaucomatous, sightless eye. Here, all treatment failing to permanently relieve the condition, the eyeball was enucleated. The author contrasts *keratitis bullosa* with pemphigus of the cornea. The former he describes as an inflammatory, the latter as a non-inflammatory, vesicle.

Kollock, of Charleston,³⁴⁷ attributes the great susceptibility of the negro race to corneal inflammation to their very careless mode of living and to syphilis. He agrees that trachoma is rare among the negroes of South Carolina, but holds that it is equally rare among the whites of this section. Xerosis conjunctivæ he has seen exclusively in the negro. Hagnauer²¹⁴ maintains that the various forms of keratitis described as ramiform, dendritic, ulcerous, malarial, etc., are but modifications of *herpes corneæ febrilis*, as described by Horner. He found this latter strikingly common during the influenza epidemic. In his experience it usually recurred, and frequently left a dense corneal macule.

Parker and Bloodgood, of Philadelphia,¹¹² record a series of cases of *corneal ulcer* successfully treated with the actual cautery. Chevallereau, of Paris,¹⁵² prefers the use of the compress bandage and instillations of atropine; sometimes paracentesis, or the operation of Saemisch. In the treatment of chronic superficial *abscesses* where the uveal tract is uninvolved, French, of San Francisco,⁷⁶ advocates the conversion of the affected tissue into a fresh wound, either by use of the curette alone, or by the subsequent use of the actual cautery. Dabney, of Louisville,²²⁴ considers the use of the

actual cautery the most efficacious method of treating suppurating ulcers of the cornea, especially in that form known as *ulcus serpens*. Millikin, of Cleveland,²² states that many cases of destructive ulceration of the cornea following infecting wounds lose their virulence and soon become healthy in appearance by the free use of the actual cautery. Bourgeois, of Reims,¹⁷⁸ reports five cases of grave infectious ulcers of the cornea successfully treated by these methods: Complete slitting of the lower canaliculus, followed by irrigation of the lachrymal passages with bichloride-of-mercury solution (1 to 1000) and the instillation of a 5-per-cent. solution of chloride of zinc; irrigations of the conjunctival *cul-de-sacs* and the nasal fossæ with a 10-per-cent. solution of boro-borax. He advises that evacuation of the hypopyon should be performed either by paracentesis or by drainage of the anterior chamber, preferably by the former method. A rapid recovery may be predicted if the disease does not involve more than a quarter of the corneal surface. Instillations of eserine should be made every twelve hours, followed by the insufflation of aristol; an occlusive antiseptic dressing should be applied, antisepsis being obtained and maintained by the application, every two hours, of several drops of a 1-to-1000 bichloride solution.

Hoor⁵¹² reports a case of keratitis marginalis, and agrees with Fuchs in considering it to be an independent disease. He thinks that the marginal infiltrate is never absorbed; that the disease is usually found in old people, affects one eye, and is probably of mycotic origin. In cases of spreading ulcer of the cornea, with hypopyon, Williams, of Liverpool,⁶ makes use of the following mixture:—

R. Quinine sulph. neutr., gr. iv (0.26 gramme).
Liq. atropis sulph., f $\frac{3}{4}$ (80.00 grammes).
M. ft. guttae.

He believes that quinine, locally applied, has the power of arresting the suppuration. If operative interference be imperative, he introduces a Graefe knife into the anterior chamber, underneath the purulent collection, and carries the incision directly upward in the direction of the pupil, taking care not to enter the pupillary space; the knife is then quickly withdrawn with a forward motion, the escaping aqueous carrying with it the purulent mass.

A case of extensive *wrinkling of the cornea* has been seen by

Burnett, of Washington,²⁴⁰ in an eye which later developed a low grade of circumscribed keratitis. In a case of *corneal fistula*, Angelucci⁵⁶⁰ obtained a fairly satisfactory result by transplanting a plug of cornea taken from a rabbit into the fistulous opening. Union was good, and the transparency of the membrane was preserved to a great extent.

In a second communication upon "Galvanism in the Treatment of Corneal Opacities," Alleman, of Brooklyn,⁷⁰⁰ states that, although occasionally an eye does not bear the current well, the method usually is productive of good results. Baldinger¹⁰⁰⁷ reports a case in which he claims the efficacy of massage in clearing the cornea of traumatic opacity. The patient, a 60-year-old woman, whose vision was reduced to "shadows," is said by the writer to have had it improved to $\frac{20}{LXX}$.

Albrand³⁵⁸ has seen fifteen cases of so-called "band-like" keratitis, which he believes were caused by impure atropine. In these cases the corneal epithelium had been injured either by disease or by traumatism. In two, the formation of the bands ceased immediately upon the discontinuation of the drug; in three others, the symptoms subsided several days later.

In a case of *adherent leucoma*, Cassar, of Malta,⁵⁸⁹ has had a profuse haemorrhage follow an attempt at iridectomy for adherent glaucoma. A second operation was deemed necessary, but after the blood was absorbed the vision was so good that it was not considered advisable. Nicati, of Marseilles,⁴⁶ advises puncture of the posterior chamber, or sclero-iritomy, where there is retention of the aqueous humor. He believes that this procedure is indicated in all cases of pupillary occlusion, when iridectomy would not be practicable, especially in cases of staphylomatous leucoma.

Chiralt, of Seville,⁶³⁴ believes that the prognosis of *partial staphylomata* of the cornea is always bad, especially when the pupil becomes elongated. During the first period, the treatment should be the same as for simple parenchymatous keratitis, while in the second stage he thinks eserine, together with decoctions of poppy and compression by means of an antiseptic bandage, are indicated. Tweedy, of London,², advances the hypothesis that the main physical factor in *conical cornea* lies in an inherent weakness of the corneal structure, resulting from an imperfect growth, in early foetal life, of the central portion of the mesoblastic tissue

which filled in the gap in the embryonic cornea, caused by the involution of the epiblastic tissue giving rise to the lens.

In a case of *double keratoconus*, in a woman aged 22 years, Gibson, of Youngstown, Ohio,⁶¹ performed paracentesis of both corneæ with a galvano-cautery needle introduced through the opaque summit of the cone. A subsequent iridectomy gave, with proper correcting lenses, a vision equal to $\frac{1}{2}$ in each eye. According to the author, the advantages of making paracentesis with the galvano-cautery are: "1. Perfect antisepsis or asepsis. 2. Prolonged drainage of the anterior chamber. 3. The resulting opacity is reduced to a minimum. 4. There is doubtless some shrinkage of the cicatrix, which would tend to reduce the curvature of the cornea somewhat."

Wallace, of Philadelphia,⁸⁰ gives the notes of five cases of interstitial keratitis, in which the visual acuity was markedly improved and the corneal and conjunctival irritation and congestion much relieved by the local application of aristol. Mitvalsky, of Prague,¹⁹⁰ highly recommends the use of ungt. hydrarg. ciner. in the treatment of parenchymatous keratitis and opacities of the cornea, provided, as he says, that there is but little injection of the iris or of the ciliary body. He claims that the ointment, where it is not contra-indicated, shortens the inflammatory process by one-half the time usually needed for the ordinary method of treatment, and will speedily cause the absorption of any of its products.

Caspar²⁵⁴ describes *papillomatous and carcinomatous tumors* occurring at the limbus of the cornea. He reports a case of the latter that had penetrated the sclerotic. Enucleation was done, but metastasis to the glands at the angle of the jaw had already occurred. There was no secondary growth in the orbit. Norsa²⁵⁴ reports three cases of *scleritis* and *episcleritis*, which had resisted long-continued ordinary treatment, and which he claims to have cured by the employment of a galvanic current through the medium of medicated water. The method of applying the current is as follows: To one end of an eye-pipette is attached a gum tube, which conveys a 1- to 2-per-cent. solution of salicylate of lithium from a suspended reservoir. Through the other end of the pipette a metallic tube is passed, to which one pole of the battery is attached, while the other pole is placed over the cervical sympathetic nerve.

Mansfield, of Baltimore,¹⁹ states that the results obtained from massage with yellow oxide of mercury (3 grains to 1 drachm—0.19 to 3.89 grammes), in the treatment of episcleritis, have been very gratifying when associated with the internal administration of anti-rheumatics. In an eye attacked with scleritis and episcleritis, Purtscher, of Klagenfurt,¹⁹⁰ discovered a detachment of the retina corresponding to the seat of disease in the sclera. In a little more than a month's time the detachment had healed spontaneously. The author thinks that the scleral inflammation had caused a stasis in the lymph circulation, and that the detachment was the direct result of localized accumulation of the fluid. Kamocki, of Warsaw,¹⁹⁰ reports a similar case of scleritis with detachment of the retina, which was cured spontaneously. The patient had an attack of measles, and, after her recovery, three weeks later, the detached portion had become adherent. He agrees with the previous author as to the probable etiology.

DISEASES OF THE IRIS AND CILIARY BODY.

A case of congenital double *corectopia*, in a man aged 45, is reported by Fromaget.¹⁸⁸ The pupils were situated above and in; the right had the form of a rectangle, rounded at the angles, and the left was slit-like in character. There was also luxation of both lenses, and an atrophic retino-choroiditis. The patient had light-perception in the right eye. There were no other malformations.

Hess, of Leipzig,¹⁸⁸ reports an interesting case of *iridodialysis* of non-traumatic origin, and without apparent alterations in the cornea or in the sclera. The patient was a boy, 14 years old, who had had good vision until 8 years of age, when he suffered from scarlet fever. The author thinks that, subsequently to this, the patient had an attack of low-grade iridocyclitis, which was followed by secondary glaucoma, a portion of the periphery of the iris becoming adherent to the surface of the cornea. He believes that the tension exerted by this synechia upon the remaining portion of the iris, already atrophied by chronic inflammation, produced the tear in the membrane. Burnett, of Washington,²⁴⁹ has seen a *cyst of the iris* develop after the performance of an iridectomy, with removal of a cilium from the anterior chamber and the discussion of a secondary cataract, in an eye which had been injured eleven years previously.

In speaking of the etiology of the various forms of *iritis*, de Lapersonne¹⁴ advances the view that they are all infectious. He believes that, where the condition occurs as a result of syphilis, etc., it may be regarded as an attempt at elimination by the gland (the uveal tract being considered as such).

In a case of long-standing syphilitic iritis, complicated by a staphyloma at the sclero-corneal margin, Johnson, of Washington, D. C.,¹⁹⁶ has had marked improvement following incision of the protuberance and the administration of an energetic mixed treatment. A case of syphilitic iritis with condyloma, occurring three months after infection, and yielding in nineteen days to the ordinary treatment by inunctions, is reported by Vallas, of Patras.¹⁷³ De Schweinitz, of Philadelphia,¹⁰⁵¹ states that the resorption of true gumma of the iris is more rapid under the influence of potassium iodide in massive doses than under inunctions of mercury. Purtscher, of Klagenfurt,¹⁹⁰ reports a case of *anterior synechia*, where the pupillary border and periphery of the iris were free, but the central zone was adherent to the posterior surface of the cornea, giving the appearance of a circular conical elevation. The condition appeared after a contusion of the globe. There was no evidence of corneal perforation. Coppez²⁷⁸ _{Apr. 22} reports a case of *tubercular iritis* in a boy of 16. The tubercles were situated principally in the irido-corneal angle. Reche, of Breslau,⁸⁵⁸ reports three cases of *iritis haemorrhagica*, in which the anterior chamber was filled with blood, which was finally totally absorbed. In all three there was a distinct rheumatic history. Wilmaers¹⁵⁴ saw an iridectomy do marked good in a case of serous iritis, which had been followed by an attack of articular rheumatism. The author considers rheumatic iritis to be a lymphangitis of the anterior segment of the eye. Based upon the careful study of forty suitable cases of *plastic iritis*, in which the manifest refractive error was repeatedly and carefully estimated, Oliver, of Philadelphia,³⁴⁷ concludes: 1. In nearly every case of iritis, especially of the plastic form, there is a period, even after full pupillary dilatation has been seemingly artificially obtained, during which, owing to the persistence of inflammatory changes in the uveal tract, as so well expressed by the clinical evidences of ciliary spasm, etc., graduated instillations of mydriatics should be employed; the duration and gravity of this period being most accurately measured and deter-

mined by the systematic and repeated estimation of the varying manifest errors of refraction. 2. Whilst it is true that, during this stage in nearly every case of iritis, ophthalmometric or, rather, keratometric study seems to show at times that there are *bizarre* and curious changes of corneal curvature, yet it must be conceded, from the additional findings of other optometric methods, that the bulk of the ametropic change in such cases is due to perversion of lens action from what Koller terms "spastic accommodation," as the result of ciliary irritation and inflammation. 3. In nearly every case of iritis the duration of this stage can be promptly shortened by the judicious and ready use of some quick and powerful intra-ocular muscular paralyzant, the character of the necessary form of the drug and its amount at the time in every instance being judged by the amount of manifest refractive error found at that time. 4. In some few cases of iritis, however, during the acme of the attacks, especially if the case be pronounced in type and stubborn in character, the higher grades of the manifest refractive error seem to obstinately persist with but little variation in amount, and to defy for a long time reasonable local and general measures. 5. In some few cases of incipient iritis, where clonic spasm of the ciliary muscle seems to present itself, or pupillary contraction repeatedly persists, local muscle paralysis, as evidenced by a relative decrease of refractive error, is often quickly obtainable by the prompt and energetic employment of some of the more powerful and appropriate local and general remedies. 6. Consequently, the careful systematic estimation of the manifest error of refraction found during attacks of iritis is of great value in the rational and scientific treatment of this disease, offering itself as not only a means by which the general prognosis of the affection can be made more certain from time to time during its progress, but permitting itself to serve as a measure or guide, as it were, by which the attacks may be more properly and more understandingly treated, and their duration shortened by the judicious and intelligent use of appropriate drugs, thus giving a better opportunity for lessening the chances of harmful and permanent after-changes to one of the most important, and yet one of the most susceptible, organs of the ocular apparatus." Claiborne, of New York,⁴⁸ states that in the treatment of iritis the action of atropia is often augmented by the use of the Turkish bath.

In cases of recurring *iridocyclitis* with closure of the pupil and hypotony of the globe, Burnett, of Washington,¹⁰¹⁸ is against the performance of iridectomy, his experience being that the artificial pupil does not remain patent. Jackson, of Philadelphia,¹⁰⁵¹ attributes the discoloration of the iris, which occurs in inflammations of that membrane, to local hyperæmia. Whiting, of New York,²⁵⁴ reports a case of *primary sarcoma of the iris*, with secondary nodes in the choroid. The growth was first noticed when the patient was 10 years old, and was probably congenital. For a number of years it caused repeated small haemorrhages into the anterior chamber, which interfered but little with vision. When the patient was 58 years old enucleation was performed, the growth having destroyed the eye. The small melanoma had developed into a sarcoma, which had infiltrated all the structures of the globe. From twenty-eight melanotic tumors of the iris, twenty-six being found malignant, the author concludes that all melanotic tumors should be regarded with suspicion, and should be removed as soon as they cease to be inactive and no longer cause irritative symptoms. Van Slyck, of St. Paul,¹⁰⁵ has enucleated an eye containing a sarcomatous growth situated just posterior to the iris.

Lagrange¹⁸⁸, ^{Dec. 27, 1911} has examined microscopically a cylindrical epithelioma of the ciliary processes, removed from a child of 8 years. He considers the presence of the tumor in this position proof that these processes are covered by cylindrical epithelial cells, which secrete the aqueous humor.

DISEASES OF THE LENS.

Dor, of Lyons,⁷⁸, divides *congenital cataract* into five forms: (1) pyramidal; (2) zonular; (3) nuclear, or central; (4) total; (5) unusual forms, as central punctiform, stellate, dendritic, fusiform, etc. There is usually no treatment required in the first form, vision not being, as a rule, below $\frac{1}{2}$; sometimes, if vision is below $\frac{1}{3}$, an iridectomy may be useful. If the diameter of the opaque zone exceeds 5 to $5\frac{1}{2}$ millimetres in the zonular variety, an iridotomy or sphincterotomy is indicated; but as these operations are difficult of execution and often dangerous, a simple iridectomy is preferable. As regards the operative interference upon the lens itself, discussion, several times repeated, suffices until the age of 8 to 10 years. From 10 to 20 years, ripening of the cataract may

be provoked by means of discission, linear extraction being done a month later. After 20 years, flap-extraction, with or without iridectomy, is indicated. The third variety, being nearly always a derivative of zonular cataracts, should be treated similarly. For total cataracts, the operation of choice is discission. To avoid disuse of the retina in this series of cases, it is important to operate early. The extraordinary forms of congenital cataract do not usually demand an operation. An iridectomy is, however, at times indicated, and some may have to be treated on the same principles as the zonular forms of the disease.

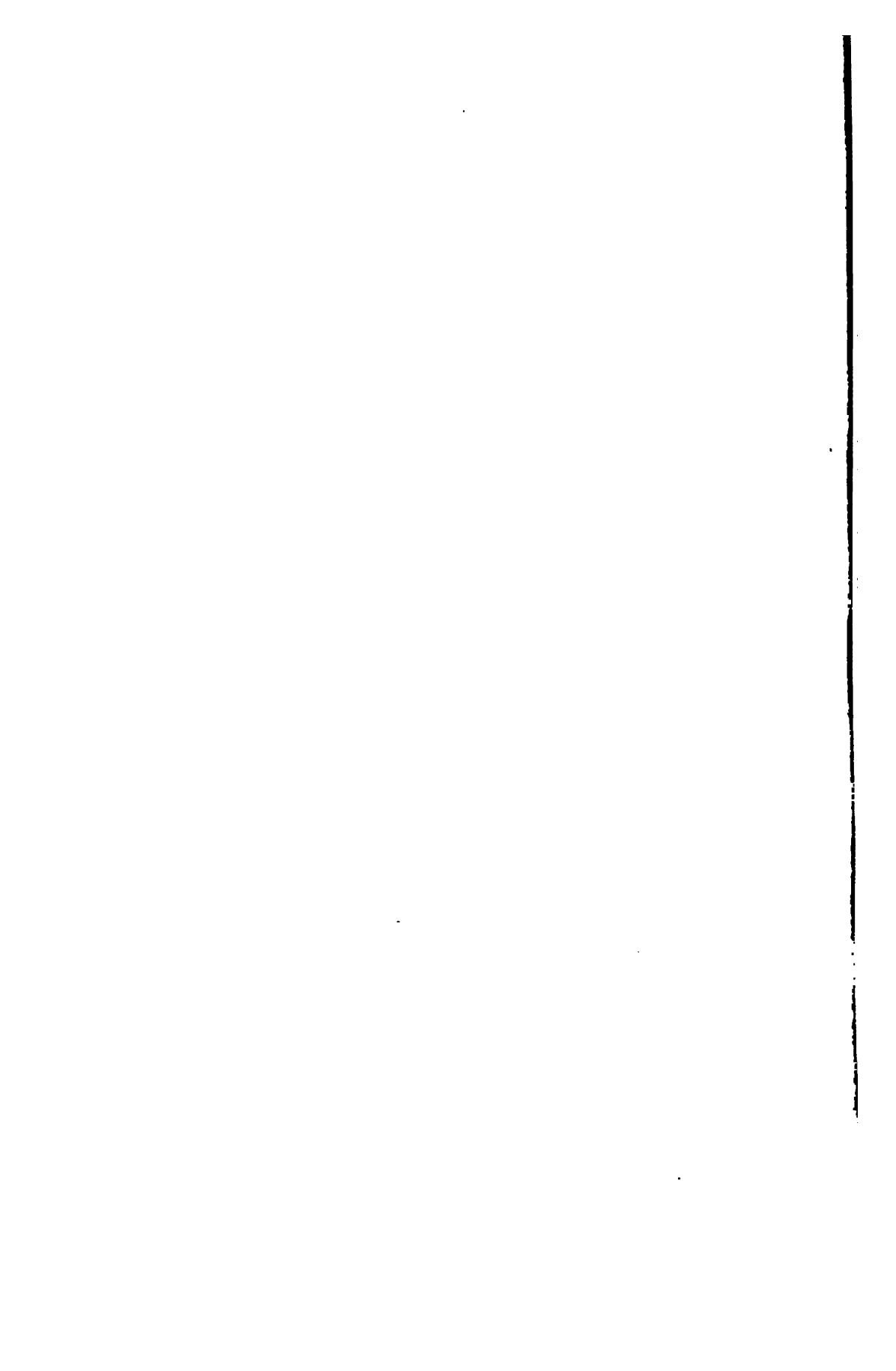
Baker, of Cleveland, O., ⁶¹ offers the following conclusions upon "*Infantile Cataract*": "1. Infantile cataracts should be operated upon early, within the first year if possible. 2. In pyramidal and zonular cataracts in which vision cannot be improved to $\frac{1}{10}$ after fully dilating the pupil, removal of the lens is to be preferred to iridectomy. 3. Fluid cataracts are best removed at once by linear extraction. 4. Soft cataracts, including zonular and capsular, are best treated by first breaking up the lens thoroughly and removing, a few days later, by the combined linear extraction and suction operation. 5. Simple discission is sufficient in very young infants, unless nystagmus should be present. 6. Only one eye should be operated upon at a time. 7. There are a few cases in which it may be advisable to extract one lens for distant vision, and make an iridectomy on the other eye, so that a certain amount of accommodation may be preserved for near work."

Zirm, of Vienna, ⁸⁶⁸ reports several rare cases of congenital cataract, in which there were strong evidences of heredity. Case 1. That of a boy with double stellate cataracts (Figs. 1 and 2), whose father, older brother, and a cousin had the same form of cataracts in both eyes. Several members of the family were myopic. Case 2. That of a rachitic boy, also with double stellate cataracts; both eyes were hypermetropic, showing, in the author's opinion, that there need not have been a causal relationship existing between myopia and congenital cataract. Case 3. That of a young man, also rachitic, who had cataracts of a mixed character; that is, punctated and laminated. One eye was myopic (20. D.); the other emmetropic. Case 4. That of a child 5 years old, apparently robust, who exhibited a peculiar combination of laminated and



Cases of Congenital Cataract, (Zirm).

Klinische Monatsblätter für Augenheilkunde



nuclear cataracts (see Fig. 3). The mother of the child had a typical nuclear cataract in one eye and a secondary one in the other. Case 5. That of a rachitic child with the double nuclear variety of the disease (Fig. 4). The father of this patient had a cataract since childhood. Case 6. That of a boy with an anterior eccentric capsular cataract (see Fig. 5), whose uncle had a stellate opacity.

Powers⁷⁷ has had the good fortune to study three cases of congenital cataract of both eyes in children. In each instance the opacity was confined to the posterior plane of the eye, and occupied less than one-half of its horizontal diameter. The cuts on page 80 illustrate an article by Treacher Collins, of London,⁷⁸ based upon the microscopical examination of six eyeballs. He found the earliest change, in the formation of pyramidal cataract, to be a localized disturbance and proliferation of the epithelial cells which line the hyaline capsule at the anterior pole of the lens. In cataracts of longer duration he discovered a layer of cells between the opaque part and the subjacent unaltered lens-substance, which was derived from the cells lining the anterior capsule elsewhere. Later these cells secreted a hyaline capsule analogous to that of the lens.

Mules, of Manchester,² joins issue with observers who demur at the presence of pyramidal cataracts with clear corneæ, providing they accept as instances the usually received examples of anterior polar opacity with more or less marked prominence. Righby¹⁰⁵⁵ has successfully operated on a case of zonular cataract of two years' standing, in a Hindu male aged 15 years, by Graefe's operation. The capsule was opened by a horizontal incision at its upper third with the Graefe knife, and the broken cortex removed by pressure with the spoon, small pieces of sponge, and by flooding the anterior chamber with a boracic-acid solution. Bagnérat⁵⁷⁷ cites a case of double zonular cataract in a boy of 7 years. One of the lenses progressed to complete opacification in a year, whilst the other remained unchanged. In a case of zonular cataract, Tobin, of Halifax,²⁸⁴ has had improvement of vision in the left eye following an iridectomy, while in the right the same result was obtained by performing a preliminary needling followed by linear extraction. Cassar, of Malta,⁵⁸⁹ has had good vision follow an iridectomy in an adult eye containing a zonular cataract.

Marbourg, of Pueblo, Col.,¹⁰¹⁸ has seen erythropsia follow a needling operation for lamellar cataract. The phenomenon came

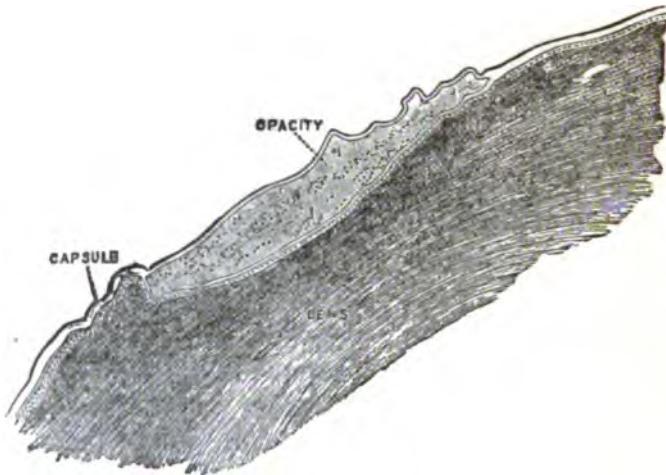


FIG. 1.—PYRAMIDAL CATARACT OF ELEVEN YEARS' FORMATION.
A complete layer of hyaline capsule covers the opacity; a similar hyaline layer, lined by cells, passes between the opacity and the lens-substance.
(*Ophthalmic Review*.)

on upon the day of operation, soon after the appearance of the catamenia, and lasted three days. Ten days later it reappeared, the

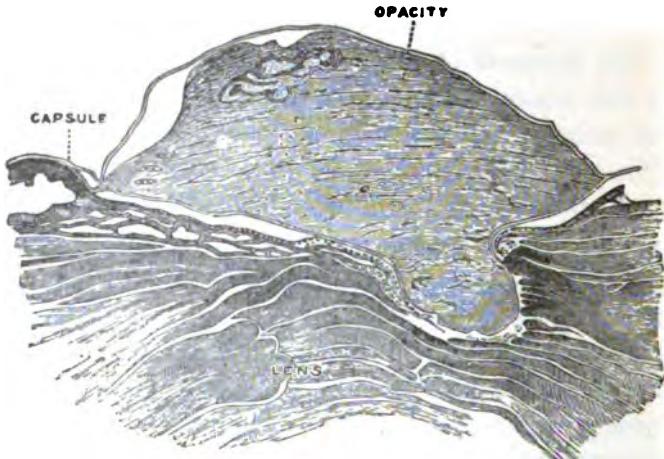


FIG. 2.—PYRAMIDAL CATARACT OF TWENTY-ONE YEARS' FORMATION.
A layer of hyaline capsule in front of the opacity; a similar layer of equal thickness, lined by cells, behind it.
(*Ophthalmic Review*.)

discoloration being of a rose-pink hue, and recurred after each instillation of atropine. A successful discussion had been performed on the fellow-eye without the supervention of this symptom.

In support of the view that cataract may be caused by violent convulsions and other jars of the body, Bistis²³² cites a case where a discharge of a gun was sufficient to rupture the capsule of an already cataractous lens. De Beck, of Cincinnati,⁴²⁸ has seen a case of left uniocular cataract in a "left-handed" man 37 years of age, a molder by trade. The cataract presented an iridescent, asbestos-like gleam. The author considers the case analogous to what is popularly known as "glass-blowers' cataract."

From the study of a "*case of mineral or calcareous degeneration of the crystalline lens*" in an elderly Mohammedan female, Chatterji, of Barabanki, Oudh,²³⁹ believes that a calcareous degeneration of this organ may result directly from some interference in its nutrition. Topolanski, of Vienna,³⁵⁸ has observed the same conical, vesicular formations on the edge of the lens as described by Magnus (see ANNUAL, 1892, vol. iv, B-78), and agrees with this author as to their appearance and location, but differs with him as to their origin, Topolanski contending that they arise from the tension exerted by the fibres of the zonula upon the capsule of the lens, and that they consist not only of the lens-capsule, but also of the lenticular substance.

Two cases of *vacuoles of the lens* have been seen by Dunn, of Richmond, Va.⁵¹ In the first instance the "bubbles" were scattered throughout a cloudy lens, and were irregular in size and distribution. This patient also suffered from a neuro-retinitis of probable specific origin. In the second case the patient complained of diffusion of light in the right eye which seemed to emanate from small luminous objects. Examination showed, in the centre of the lens, a perfectly-round "bubble," which appeared to be about the size of the "head of a pin" when seen with a + 20. D. lens.

Seven or eight hours after a blow on the eye, Bursenti,⁵⁸⁹ saw an opacity form in a lens that had been perfectly normal previous to the accident. Millikin, of Cleveland, O.,⁶¹ gives the notes of six cases of injury to the lens, and lays great stress upon the importance of the immediate use of a mydriatic, being "convinced that the rest afforded by complete paralysis of accommodation is of the utmost advantage, as it protects the lens-tissue from the disturbances which necessarily must arise from the effort of using the eye." Chacon¹⁷⁹ has seen absorption of a crystalline lens that had been luxated into the vitreous during an operation upon the

eye for glaucoma. The case occurred in a boy. The author thinks that all children have remarkable tolerance for that which would cause glaucoma in adult eyes. Burnett, of Washington,²⁴⁹ has successfully removed a traumatic, totally dislocated lens from beneath the conjunctiva. The same author records a case of partial subconjunctival dislocation of the lens, the result of an injury. A portion of the lens was engaged in a rupture of the sclera.

Oliver, of Philadelphia,¹⁰¹⁸ has successfully removed a traumatically dislocated lens from the anterior chamber of an eye presenting glaucomatous symptoms. After transfixing the lens with a stop-needle, extraction was accomplished by introducing a wire loop through a broad peripheral corneal incision; owing to an irreducible prolapse of the iris, an iridectomy had to be made. Healing was uninterrupted, and normal vision with a correcting glass was regained.

Dujardin,²²⁰ commenting upon the causation of traumatic luxation of the lens into the anterior chamber, states that this usually occurs when the patient is bent forward, the centre of the cornea being struck at that time. He believes that when the blow is nearer the periphery the luxation takes place in the direction of the force applied. Abadie, of Paris,¹⁷³ has successfully removed three completely luxated lenses by the aid of an electric photophore, which was made to illuminate the interior of the eye. After the illumination had been effected, a pointed hook was introduced through the sclera to fix the lens, which latter was held in position whilst an assistant lacerated the capsule with a cystitome that had been introduced into the anterior chamber. The resulting soft cataracts were removed, six or eight days after, by aspiration. Killen¹² reports five additional cases of successful extraction of dislocated lens by means of the Agnew bident, and three cases where the lens was extracted successfully without the use of the bident. He believes that the instrument will prevent the dislocated lens from sinking still further into the vitreous, and also will hinder the escape of a fluid vitreous.

In a case of old traumatic, dislocated, cataractous lens, seen by Symon,²⁶⁷ the central half of the pupillary quarter of the iris was altered in color and in brilliancy, while the ophthalmoscope revealed an alternate free transmission of the choroidal reflex and intercepting radial lines of iris-stroma. The author thinks that this latter

points to a previously existing radial muscular mechanism in the once healthy iris. In a case of traumatic cataract in which extraction had been performed by Barrett, of Victoria,²³⁶ the cicatrix in the cornea became united with a remnant of lens-capsule through the medium of a cord of similar tissue. A case of traumatic cataract, with subsequent absorption of the lens, is reported by Guthrie, of Lyttleton.⁵⁵⁷

G. C. Hall, of Allahabad, India,²³⁸ proposes the following classification of *mature cataracts*: (1) fluid (Morgagnian); (2) sticky; (3) hard; (4) semi-fluid. In operating for the first variety, iridectomy may, as a rule, be dispensed with; while, in the second, a large section with a free iridectomy should be made, and, if possible, the lens extracted in its capsule. The author does not consider an iridectomy necessary in the third type, and says that the incision may be made in the sclerotic; while in the fourth class an iridectomy is advised. Calhoun, of Atlanta,¹¹⁷ records 904 operations for cataract. Of this number, 203 were cases of the soft variety, in children. The author says that "if he got 95 per cent. of successes he thought he was doing well; but, since the injection of cocaine and the advent of antiseptic surgery, 100 per cent. of successes has been the result in his cases."

In a review of the present status of the operation for cataract, Pflüger, of Berne,²³⁹ claims that, as an antiseptic, non-irritant, and non-poisonous, a solution of the trichloride of iodine, in strength of 1 to 4000, 1 to 2000, and 1 to 1000, will not permanently affect the endothelium of the cornea nor cause permanent opacities of the same. He makes the corneal incision in the vertical meridian, from one-half to one millimetre within the limbus, and opens the capsule either after the method of Galezowski or with the pincette of Terson. In one hundred and fifty capsular extractions without iridectomy he had not lost an eye, and he considers the simple extraction of senile cataract to be the greatest progress made in the operation within the last twenty-five years. He advises that iridectomy should be done, however, when the patient cannot be kept at perfect rest. He does not think that every senile cataract, in patients over 60 years of age, can be operated on without regard to its maturity. During the operation he advocates the local use of cocaine and artificial illumination, and says that at times irrigation of the anterior chamber with boric-acid solution is of use.

In a comparison between the results of extraction by Graefe's linear method and the flap operation without iridectomy, de Wecker¹⁷¹ has had 5 cases of sympathetic ophthalmia, following the first plan, in 1500 cases from 1867 to 1875, and only 2 in 5000 cases following the second procedure. He considers that iridectomy favors sympathetic ophthalmia by permitting the capsule of the lens to become entangled in the corneal incision, thus furthering the entrance of germs, whilst, in the simple method, the rapid formation of a cicatrix free from all entanglements forms the best protection against infection.

In the latest series of cataract extractions, which includes 301 uncomplicated cases and 45 complicated cases, reported by Knapp, of New York,¹⁷¹ 37 only were performed with iridectomy. The statistics show that in 84 per cent. good results were obtained; in 13 per cent., moderate results; and in 3 per cent., failure. Considering the findings of this series in connection with the preceding one, making a total of 683 cases, 10 per cent. were operated upon by the combined method, with no more than 2 per cent. of failures.

During the past year, Chevallereau, of Paris,¹⁵² May 20 has removed 187 senile cataracts, of which 175 were simple operations, 10 extractions with iridectomy, and 2 extractions with the curette. He has discontinued the use of eserine after the operation. Alt, of St. Louis,¹⁷² Dec. 14, 1911 prefers simple extraction, and considers "a lens fit for removal as soon as it interferes with the proper functions in the patient's business or profession." The author operates "according to circumstances, either in his office or before the class in the dispensary." The capsule is opened by a T-shaped incision, and the prolapse of the iris is prevented by pressing upon the periphery of the iris with a flat metal spoon. The patient is only restricted sufficiently to avoid any tendency to his re-opening the wound. Discussion is usually performed two or three weeks after the extraction.

Schulek, of Budapest,¹⁷³ prefers the simple extraction. With Förster's forceps he pinches out as large a piece of the capsule as possible. The lens is then expressed with Davel's spoon. After simple extraction, Cant, of Lincoln,¹⁷⁴ Sept. examines the eyes within twenty-four hours, and if a prolapse of the iris is found, no matter how slight, the patient is anæsthetized and the prolapse is excised,

any tendency to adhesion at the edges being freed with the spatula. In doing the iridectomy, he advises that the scissors be held at right angles to the corneal wound, and that the iris be severed with one snip. In performing simple extraction, E. Jackson, of Philadelphia,¹⁴⁴ opens the capsule with the point of the knife used in making corneal sections, after the latter has been completed. The advantages claimed by him for this method are: that the cystitome is gotten rid of; that the small opening thus made nearly in the direction of the corneal incision seems to have a decided influence in making sure of the proper rotation and presentation of the lens; that the cortical matter, as well as the nucleus, escapes with greater ease; and that there is no chance that portions of the capsule will prolapse into the wound. In a series of eight extractions without iridectomy, Kilpatrick, of Halifax,²⁸⁴ has had prolapse of the iris in but one case.

Based on 30 cases, Fage, of Amiens,¹⁸⁸ states that in 15 extractions without iridectomy he got $V = \frac{1}{2}$, with no bad results; whilst in the same number of cases with iridectomy he got $V = \frac{1}{2}$, with 1 case $V = < \frac{1}{20}$. He believes that the principal advantages of simple extraction lie in the preservation of the function of the iris by the cutting off of the marginal rays, thus subserving, in a measure, the accommodative power and overcoming, to some extent, any astigmatism that may follow the operation. He does iridectomy when there are synechiæ; and in secondary and traumatic cataract where the tension is increased, or where he fears paralysis of the iris as a consequence of the operation. Ryerson, of Toronto,¹⁰⁰⁷ finds that eserine rarely causes iritis after cataract extraction, if used in not greater strength than $\frac{1}{2}$ grain (0.0081 gramme) to the ounce.

The results obtained in a series of 282 cataract operations performed, with 4 exceptions, upon natives of India, are reported by Blood, of Dublin.¹⁹⁷ An iridectomy was made in all but 2 cases, a 3-millimetre flap being followed by a very narrow iridectomy, the pillars of the coloboma gently stroked down, and atropine instilled. The author considers the use of this drug important, as it keeps the iris out of the way of any remaining lenticular matter. Eighty-eight per cent. of the cases were successful, the remaining being complete failures: 21 from iritis, 3 from sloughing cornea, 6 from panophthalmitis, 1 from detachment of the retina, and 3

from opaque lens-substance. Randolph, of Baltimore,⁷⁶⁴ gives the results obtained in a series of fifty consecutive operations for cataract, and states that, thus far, he has seen no reason for abandoning iridectomy. Calhoun, of Atlanta, Ga.,⁸¹ prefers extraction with iridectomy, and adheres to the use of the roller-bandage over both eyes for a period of from four to six days after the operation.

In overripe cataracts with synchiae, Panas, of Paris,¹⁷ extracts the lens by doing an iridectomy above, followed, if necessary, by one below. Those lenses which present slight adhesions and are movable are to be delivered with a Graefe spoon, after having placed the patient under the influence of a general anæsthetic. Discussion is not advisable. In large cataracts not entirely mature, Bagnéris⁵⁷⁷ prefers a broad incision and preliminary iridectomy. Murray⁶ always makes an iridectomy, taking care to leave a narrow coloboma. He considers the use of eserine, previous to the operation, of great importance, as "it keeps the iris well away from the knife when making corneal section; it prevents prolapse of the iris when the section is completed; enables one to make a small, neat, slit-like coloboma, and facilitates proper reposition of the angles of the severed iris."

From the results obtained in a series of fifty-four cases of cataract extraction performed, with one exception, with iridectomy of moderate size, Woodward, of Burlington, Vt.,²⁴⁹ is confident that the best results are had when the capsule is cut transversely near the upper margin of the lens, as well as vertically through the middle of the pupillary region. His experience has been not unfavorable to the practice of washing the anterior chamber.

Among other precautions before performing an operation for cataract, Fox, of Philadelphia,¹⁰¹⁸ advises that the blood be defibrinated and rendered strongly alkaline by the administration of bichloride of mercury and iodide of potassium. The conjunctival sac should be cleansed twice daily, and, the night before the operation, an ointment of mercury should be applied to the brow of the affected eye. A pad consisting of a lining of antiseptic gauze, a layer of cotton, a piece of linen, and an external covering of white gauze, all hydronaphtholated and secured by adhesive strips or a knitted bandage, is applied as a dressing.

Landolt, of Paris, (corresponding editor)²⁷⁴ strongly prefers iridectomy to the simple extraction. Hæmorrhage is controlled

by cold aseptic compresses and any blood is removed with sterilized plugs of cotton. To prevent prolapse of the iris, the author excises it along the whole extent of the wound. For the cystotomy, which should be large,—extending beyond the borders of the pupil,—he prefers an extremely fine Snellen hook or a triangular knife. He has also used the instrument invented by Smith, of Detroit, with gratifying success. Good light is very essential. The author has found the invention of Chibret to be very useful. A careful "toilet of the eye" is insisted upon; cortical masses are removed by massage made with the eyelids or by means of a delicate silver curette. Intra-ocular lavage is not usually recommended, as all solutions are irritant to the tissues. In exceptional cases, lavage with cyanide of mercury (1 to 2000) is practiced, but without the introduction of any instrument.

The secondary operations are included under the heads of iridectomy, iridotomy, and extraction of secondary cataract. The author states that iridectomy is best done with the lancet; iridotomy by means of special knives, or the scissors of de Wecker; whilst extraction of the capsule and its contents is accomplished with an iridectomy forceps. He believes that the dangers of the secondary operation, particularly of the discussion, are far greater than those of the primary extraction. The author therefore insists that, if possible, even greater regard is to be paid to antisepsis in these cases than in the primary operations. If the least trace of vitreous appears in the wound, it should be destroyed with the galvano-cautery; if a small prolapse of the iris occurs, it may also be gotten rid of in a similar way. The author makes it a rule that absolute repose should be observed after the operation. As for the dressings, it is his custom to cover both eyes, and he has found a wire mask covered with cotton to be a useful protector. The hands of the operator are to be cleansed with soap and warm water and a nail-brush, then dipped in alcohol, and finally allowed to remain for a short time in a solution of bichloride of mercury (1 to 100 or 1 to 500). The author then introduces his hands into a pair of sterilized linen gloves, which are removed just before the operation. In this way his hands are prevented from coming in contact with anything. The dressings should be placed in a steam (autoclave) sterilizer, together with the non-cutting instruments. Cutting instruments should be

immersed for forty minutes in a solution of oxycyanide of mercury (1 to 200). Asepsis of the field of operation is to be gained by the use of a 1-to-5000 solution of bichloride of mercury. Care should be taken that the lachrymal passages are cleansed with antiseptic injections and that the inner canthus is filled with iodol. The conjunctiva is to be irrigated the evening preceding the operation and an antiseptic dressing applied. The author concludes that the two most essential factors are antisepsis and cocaine.

Galezowski, of Paris,¹⁷⁸ avoids contusions of the iris, in the removal of immature cataracts, by dividing the pupillary sphincter. In the cataract operation without iridectomy, the corneal wound should be semi-elliptical. The puncture and counter-puncture should be placed in the sclero-corneal limbus. The summit of the flap should not be carried higher than two or three millimetres below the superior border of the cornea. He states that the expulsion of the lens should be effected without a blepharostat, the lids, during the passage of the lens, being held apart by the fingers of the operator.

In regard to corneal opacities after cataract operations, Wagner, of San Francisco,¹⁴⁷ is of the opinion that where the sublimate solution employed has been weak, or only acting for a short time, it united with the corneo-globulin, producing an opacity that is absorbed in time, while if the solution has been used in excess, or for a prolonged period, a further combination with the corneo-chondrin is formed, resulting in an opacity that can never be absorbed.

Wicherkiewicz, of Posen,⁹⁹ defends the use of corrosive-sublimate solution in cataract operations, and denies that its association with cocaine causes permanent opacity of the cornea. For six years past he has done numerous cataract operations, and has not seen one case of permanent opacity of the cornea following its employment. He avoids the use of the mercurial solution during the operation.

Hilgartner, of Austin,⁸⁵ favors the use of the silk plaster-strip dressing after cataract extraction, and condemns the employment of the compress. Baker, of Lynchburg,⁸¹ recommends the use of isinglass plaster as the best dressing after the extraction of the lens. In considering the effect of loss of vitreous upon the prognosis of cataract extraction, Hall, of Allahabad,²³⁹ says that the prognosis is serious in direct proportion to the character and to

the quantity of the tissue remaining between the lens and its capsule.

Franke, of Hamburg, ³⁵³ cites three instances of traumatic prolapse of the iris, and says that no one method of treatment will be the best in every case. Generally it is better to separate freely any connection that may exist between the cornea and the iris. If this cannot be done with a sound or a spatula, he advises excision of as much as possible of the iris; however, the latter operation is not indicated in many cases. The accompanying cut illustrates a so-called "iris shield" devised by Dodd, of Cincinnati, ²⁴⁹ for the protection of the iris in simple extraction. The contrivance is introduced into the corneal wound so as to cover the adjacent section of the iris, its inner edge extending just to the margin of the pupil. Slight pressure upon the iris gives a sufficient space between the shield and inner surface of the cornea to allow of the introduction of instruments used in capsulotomy without injury to either the iris or cornea.

In reporting ten new successful cases of suture of the cornea after cataract extraction, Suarez de Men-doza ¹⁷³ calls especial attention to a case in which he removed a zonular cataract from a child. The suture permitted him to do a flap-extraction, which, he claims, is often indicated in these cases, permitting of greater ease and rapidity in the performance of the operation. Kelch, of Louisville, ²²⁴, believing that the greater the number of instruments the greater the danger to the patient, does his extractions with the aid of but three instruments,—a speculum, a Graefe knife, and a Daviel spoon. By means of a broad iridectomy, Ramous, of Mexico, ¹⁷⁹, has successfully removed a cataract that had undergone calcareous degeneration.

Chevallereau, of Paris, ¹⁷³, cites an instance of cysts of the iris following cataract extraction. Dickey, of Wheeling, ¹⁶¹, has removed a mature cataract in a woman whose mother and two sisters and presumably a brother had had the same affection. Patterson ⁹, has successfully extracted a senile cataract without disturbing a piece of steel which had remained imbedded in the outer inferior quadrant of the iris for forty-eight years. Richard Williams, of Liverpool, ¹⁸⁷, removes secondary cataract by making



IRIS SHIELD.
(*Archives of Ophthalmology.*)

a small corneal incision with a keratome. He then grasps the capsule with an ordinary pair of iris-forceps, draws it outside the incision, and snips it off with a pair of scissors. Bliss, of Springfield, O.,¹⁰² believes that cataract may be prevented in some cases "by maintaining easy vision with glasses and by allaying any ciliary irritation." Jackson, of Philadelphia,¹⁰⁵¹ is of the opinion that lenticular opacities of "certain kinds" show a tendency to diminish, and that we may, with very good reason, hope to check the process and prevent further deterioration of vision in a considerable proportion of cases. In a series of twelve cases of incipient cataract, treated by the application of tincture of iodine and galvanism "about the eyes," together with the internal administration of tonics, Erwin, of Mansfield, O.,⁶¹ says that he has been able to save his patients a certain amount of vision, which is more serviceable to them than an aphakic eye.

Webster, of New York,¹⁵⁵ has seen absorption of an entire lens, allowing a vision of $\frac{2}{xv}$, as the result of a single needling. The patient was 25 years old. Higgins, of London,²² records a case of spontaneous cure of cataract in a man 57 years of age. According to the statement of the patient, the cataract had been pronounced fully formed ten years previously, and for the past year and a half, after sudden improvement in the vision, the sight had gradually bettered. Natanson, of St. Petersburg,³⁵³ also reports a case of spontaneous absorption of a senile cataract in a man of 65 years of age. Vision had been lost fourteen years previously. With atropine dilatation a grayish-white membrane was seen occupying the pupillary region, the thickened capsule being folded upon itself, whilst the nucleus lay at the bottom of the pupillary space.

Chisolm, of Baltimore,³⁴⁷ has seen two instances in which sight was suddenly restored to cataractous eyes by a dislocation of the lens into the vitreous. In the first instance the optic nerve became atrophic in the course of a few months, while in the second case excellent vision still remained one year after the accident. Robinson, of Stanhope,² cites an instance of spontaneous cure of cataract of seven years' duration, in a woman 92 years of age. He believes that the result was due to "pathological softening of the cataract." Sangree, of Philadelphia,⁷⁰⁰ has seen the vision gradually improve in a cataractous eye, following a blow on the orbit.

DISEASES OF THE CHOROID.

A case of *detachment of the choroid* was seen by Story, of Dublin,² in the right eye of a woman 24 years of age. The separation was co-extensive with a detachment of the retina, and extended from the margin of the optic disc downward. The detached portion of the retina contained small, brilliant, white spots and larger circular and linear white patches of degeneration. The tension of the eye was normal. In recording a case of traumatic detachment of the choroid, Sous¹⁸⁸ says that the affection should be differentiated from detachment of the retina, from that of the hyaloid, and from malignant tumor. He obtained some amelioration of the symptoms by injections of nitrate of strychnia.

In a case of *syphilitic irido-choroiditis* which grew constantly worse under mercurial frictions and the iodide internally, Lagrange, of Bordeaux,¹⁸⁸ obtained marked improvement by injecting a 1-to-1000 bichloride solution under the conjunctiva. Micleso²²³ obtained improvement in a case of specific choroiditis by the application of mercurial inunction. The patient had a marked intolerance for potassium iodide and the bichloride of mercury. Fryer, of Kansas City,⁷² reports a case of choroiditis of several months' duration, in which, notwithstanding the use of iodide of potassium, etc., vision was reduced to light-perception. Gradual improvement occurred under the hypodermatic use of pilocarpine in doses of from $\frac{1}{8}$ to $\frac{1}{4}$ grain (0.011 to 0.032 gramme).

A case in which an area of *choroidal atrophy* had assumed a zonular form is reported by Tilley, of Chicago.⁶¹ Toward the side of the optic-nerve head, the ring contained a bridge of choroidal tissue, which connected the central, apparently healthy island with the surrounding choroid. Maire, of Michigan,²⁰² has seen *ossification* of the choroid in an eye which had been sightless for years, and which had been the seat of recurrent attacks of inflammation.

Among a very interesting series of intra-ocular growths that came under the observation of Hill Griffith, of Manchester,⁹⁰ are two specimens of *leucosarcoma*. The cut on page 92 gives a representation of one of the growths. The author is of the opinion that the differential diagnosis with the ophthalmoscope between leucosarcoma and melanotic sarcoma could only be made

either when the pigment of the hexagonal pigment-layer was absent, as in an albino, or where this layer had been broken through by the growth.

Silcock, of London,²² reports a case of hereditary *sarcoma* of the eyeball in three generations. The left eye of the mother and daughter were affected with melanotic sarcoma, and it was stated that a sister of the mother had died of multiple tumors, and had lost an eye, and that the father and a twin-sister of the first patient had also lost an eye. The nature of the affection was unknown in the last three instances. Reid, of Glasgow,²³ reports two cases of sarcoma of the choroid, in which degenerative changes appeared in one portion of the tumor, coincident with the development of a new form in another part; these changes occurring in the one case at an early stage in the development of the tumor, but in the other at a comparatively late stage.



LEUCOSARCOMA.
(*Medical Chronicle.*)

In twenty-three cases of sarcoma of the choroid for which enucleation had been performed, Hill Griffith, of Manchester,²⁴ found that 60.85 per cent. recovered,—i.e., the patients were still living at periods of from three to ten and a half years after the operation; that six died from metastatic growths, the liver being infected in four cases and the stomach in two. In three cases the respective causes of death were apoplexy, pneumonia, and congestion of the lungs. The author's observations agree with those of Fuchs,—that the stage at which the eye was enucleated has little, if anything, to do with the occurrence of metastasis. He thinks that the prognosis is better for youthful patients than for those of more advanced years. He accepts as probably true the dictum that round-celled, highly-vascular growths are more malignant than the spindle-celled, and less vascular.

An example of sarcoma of the choroid, in a child 2 years of age, is reported by Meighan, of Glasgow.²⁵ The right eyeball protruded to such an extent as to prevent closure of the lids. The cornea was greatly enlarged, and the anterior chamber was filled

with a "whitish substance." The movements of the globe were almost annihilated. Upon enucleation, the growth being found to have penetrated the eyeball, the contents of the orbit were removed and the cavity scraped. Three months later the tumor re-appeared in the orbital cavity, and was removed in association with the entire eyelids. After a lapse of three months a second recurrence took place, but, owing to the enfeebled condition of the patient, no further operative procedure was resorted to. Microscopical examination showed the growth to be of the round-celled variety. Reeve, of Toronto,³⁹ has had an instance of intra-ocular growth (spindle-cell sarcoma) to occur in his practice. The organ was enucleated, on account of secondary glaucoma, the result of traumatism. Battle, of Raleigh,⁴⁰ reports a case of lymphosarcoma of the choroid, in a 21-month-old infant, in which the diagnosis of intra-ocular growth had been obscured by an internal suppuration. Microscopically, the tumor was made up of small round-cells, without pigment-clusters, the elements resembling lymph-corpuscles. The neoplasm recurred in the orbit, and the child died in a few months.

DISEASES OF THE VITREOUS.

Of eighteen hundred and eighty-four persons examined, Mittendorf, of New York,⁴¹ has found *posterior capsular opacities* at the place of attachment of the hyaloid artery in 2 per cent. He concludes as follows: "That these opacities indicate the point of attachment of the foetal hyaline artery to the posterior capsule of the lens, and that, probably, the nutrition of the capsule is sufficiently interfered with, at the time of the absorption of the artery, to lead to the cloudiness at the point of attachment; that the location of the spot on the capsule is almost invariably a little to the inner side of the posterior pole of the lens; that the spots are usually well defined. Only in one, out of fifty cases, several radiating lines, probably corresponding to branches of the hyaline artery, were visible. That in no case was there any connection of the spots with other opacities of the lens, which were seen to exist at the same time; that these spots are, therefore, non-progressive, and do not lead to any impairment of vision, nor are they apt to lead to any refractive or other changes in the eyeball; that it is only in very exceptional cases that they produce subjective

symptoms, the patient usually not being aware of their existence; that their occurrence is by no means rare, as they have been found to be present in 2.3 per cent. of a large number of eyes, and, as they are congenital, they are found equally often in old and young people; and that they appeared to be oftener met with in the male than in the female, which he considers accidental, as the number of eyes seen is hardly large enough to establish this point. Their greater frequency in the right eye is, probably, likewise accidental, for he was at a loss to explain why the right eye should be more frequently the seat of these opacities, except that it is further from the heart, nutrition perhaps a little more difficult, and the process of absorption on this account slower and less complete."

Spalding, of Portland, Me.,²⁴⁹ reports six cases of *idiopathic vitreous haemorrhages*. He is convinced that "many, if not all, of the reported cures of detachment of the retina after the use of pilocarpine are nothing but cures of vitreous haemorrhages," believing that the differential diagnosis between this disease and retinal detachment rests on a perfect field of vision in the former, and the absence of the retinal vessels on the greenish bands, if such be present, in the same affection after the haemorrhages have dissipated. Ryerson, of Toronto,³⁴⁷ reports four cases of traumatic intra-ocular haemorrhage without lesion of the external tunics, where free leeching and hypodermatic injections of pilocarpine nitrate were employed with satisfactory results. Barrett, of Victoria,²⁵⁵ has removed a *large piece of steel* from the vitreous by the aid of the electro-magnet, introduced through the original wound, which was in the outer lower portion of the sclerotic near the cornea. The eye becoming blind, enucleation was performed to avoid any risk from sympathetic ophthalmia. A case of removal of a fragment of steel from the vitreous chamber by means of the electro-magnet, with preservation of nearly normal vision, is recorded by Theobald, of Baltimore.³⁴⁷ The foreign body, which had been *in situ* eleven days, had entered the eye through the margin of the cornea, passing through the iris near its periphery without injuring the lens. Barrett and Webster, of Victoria,²⁸⁵ enucleated an eye containing a small piece of steel in the bottom of the vitreous which had remained *in situ* for a period of eleven years, exciting continuous irritation in the injured eye. Fourteen days previous





Cysticercus of the Vitreous Humor (F. López).
Gaceta Médica de México.

to the excision an iridectomy had been made with a view of locating the foreign body, but without success. By means of the electro-magnet, Roberts², has successfully removed from the vitreous a large piece of steel that had penetrated the cornea and lens and had become imbedded in this humor.

Fick²¹⁴, reports a case of *cysticercus of the vitreous*. For six months previous to the first observation the patient had noticed a black spot before the right eye. The vision grew gradually worse until the eye became completely blind. The author believes that the parasite was under the retina, but that it had worked its way through and had lodged itself in the vitreous, thus causing the complete loss of sight. Alfred Graefe²⁵³ reports the simultaneous removal of two cysticerci from the vitreous of one eye. As the patient had previously had an intestinal tape-worm, the diagnosis of the ocular disturbance was made early in the history of the disease. The case was interesting from the fact that the patient perceived the movements of the parasites. The accompanying chromolithograph is a faithful representation of an eye which was removed by Lopez, of Mexico,¹⁷⁹, on account of a cysticercus in the vitreous humor. The patient was a woman of about 40 years of age, of good constitution, who, six months prior to examination, noticed that her left eye was injected, painful, and very sensitive to light. There was also a feeling of discomfort in the right eye. At the time of examination, the pupil of the left eye was dilated (doubtless on account of the instillation of atropia). Tension was minus, the globe was painful to the touch, and light-perception was absent. On the retina, which was detached, a bright point of pearly color, which was surrounded by a bluish zone, was seen. The position of this body changed with the movements of the eye, although it did not present any spontaneous motion. The right eye was sensitive to light, and, as there was some difficulty in accommodating and converging for near objects, enucleation was performed upon the eye that contained the parasite.

DISEASES OF THE RETINA.

Priestley Smith, of Birmingham,²¹⁵, has had opportunity to observe the changes produced in the retina by the long-continued lodgment of a metallic chip on its surface. Two months after the accident the fragment of metal could be seen lying on the retina, some dis-

tance from the nasal side of the disc, and on a rather higher level. About four months later the foreign body shifted its position to a slight extent, its heavier end moving slightly downward. One month subsequently the whole chip dropped directly downward, through an angle of about 45 degrees, as shown by perimetric measurement of the existing scotoma. No further alteration in position took place, but the surface of the body was less lustrous. On the chief arteries and veins of the retina were numerous minute shining points, appearing like flecks of gold-leaf. Knapp, of New York,²⁴⁹ reports an unsuccessful attempt to extract a piece of steel that was lodged in the retina, close to the superior nasal edge of the disc. After severing the attachment of the internal rectus muscle, and drawing the posterior part of the globe forward, by means of a strabismus hook passed around the optic nerve, an incision was made through the sclera from the optic nerve, slightly nasal and upward, about four lines in length. Through this opening the electro-magnet was introduced, but failed to attract owing to accidental interruption of the current. After an unsuccessful effort to seize the body with forceps the eyeball was enucleated. According to the author, the experience gained from this case shows that "the plan of the operation was judicious and the execution correct, and that the result, in all probability, would have been satisfactory had the disturbance of the battery not occurred, or been detected during the operation."

Makrocki, of Potsdam,²⁵⁴ reports four cases of *commotio retinae*, and concludes that there is no one constant or essential symptom, the principal symptoms being haziness of the retina, peripheral scotomata of short duration, and temporary considerable diminution of central vision. He is inclined to agree with Ostwalt, however, in considering a peripheral scotoma to be the most essential symptom of the disease.

Sutphen, of Newark,²⁴⁷ has operated upon two cases of *detached retina* by scleral puncture. In the first the separation was total, but three weeks after the operation the membrane had become reattached and vision equalled²⁰ XL. The second was one of total detachment with vitreous opacities in a myopic eye. The operation was followed by re-attachment of the retina in its upper half. By making one deep subconjunctival injection of a 1-to-500 bichloride-of-mercury solution, Gorecki¹⁷³ has cured a case of detachment of the



Senile Degeneration in the region
of the Macula Lutea (Caspar).

Klinische Monatsblätter für Augenheilkunde

retina. Galtier¹⁷¹ has treated a case of retinal detachment by rest in the supine position, instillations of pilocarpine into the conjunctival sac, pressure-bandage over both eyes, and milk diet. Improvement was rapid. A relapse following, the same treatment was happily re-pursued. The writer insists upon the milk diet on account of its diuretic and depurative actions. In addition to the use of the cautery in detachment of the retina, Chevallereau, of Paris,¹⁵² May 30, July 1 makes use of the internal administration of iodide of potassium, subcutaneous injections of pilocarpine, and complete rest. Baduel⁵⁸⁹ Sept. 16 reports five cases treated by the method suggested by Schoeler. As a result of the procedure all of the eyes became much worse. In three instances the detachment occurred in myopic eyes; in the other two no cause for the lesion could be found. Notes of three cases of retinal detachment in myopic eyes are given by Story, of Dublin.²² In one instance complete cure occurred after rest in bed with bandaging and the use of atropine. In the second improvement for fourteen years resulted from similar treatment. In the third instance the detachment, which also subsided under treatment, was complicated with keratitis punctata and glaucoma. Marchetti⁵⁸⁹ Jan. 16 has observed a spontaneous cure of a detached retina in a man aged 55 years. The patient attributed the improvement to a sudden movement he had made with his head.

A rare form of detachment of the retina, which occurred in a boy who had suddenly fallen on his face, is reported by Dahrenstädt, of Berlin.¹⁹⁰ The retina was detached in the form of a closed ring. This condition is well shown in the two sketches on page 98, the one representing the ophthalmoscopic appearance and the other a sectional view. There was no other injury to the eye internally or externally, the only symptom complained of being photophobia. The author suggests that the origin of the detachment was, doubtless, the same as that of choroidal ruptures occurring in this region, which he believes are usually the result of a sudden flattening of the globe on its posterior pole, followed by a quick recovery of its normal form.

The accompanying plate depicts the ophthalmoscopic appearances of an interesting case of *colloid degeneration of the macular region* which occurred in a man, aged 68 years, who was under the care of Caspar, of Bonn.³⁵⁸ Dahrenstädt, of

Berlin,¹⁹⁰ had a case where the ophthalmoscope revealed an effusion into the macular region that had taken the form of a perfect star.

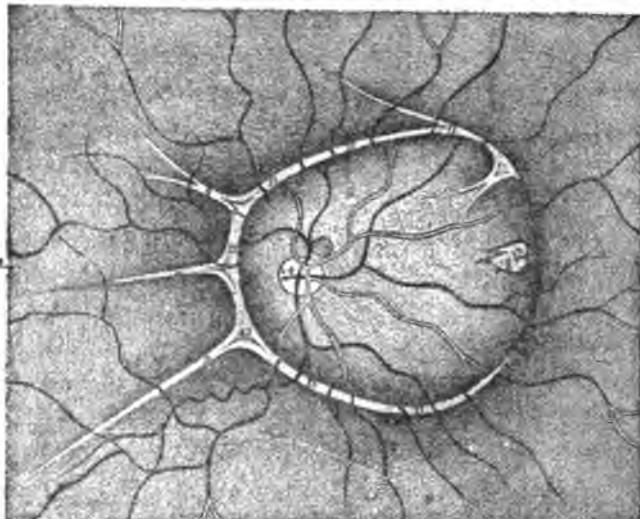


FIG. 1.

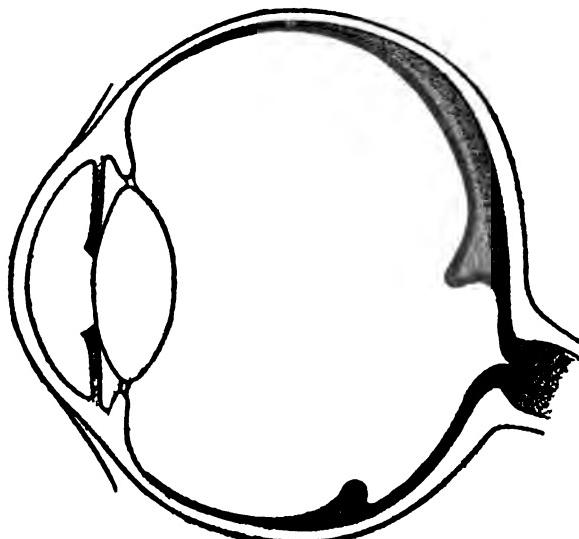
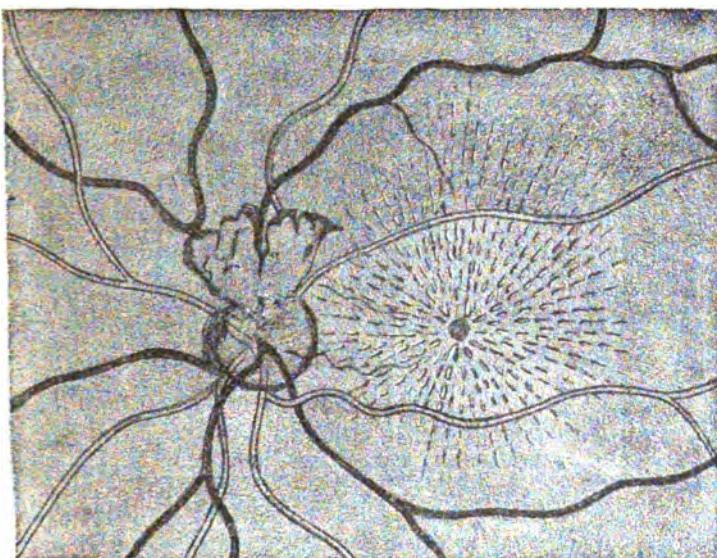


FIG. 2.
DETACHMENT OF THE RETINA.
(Centralblatt für praktische Augenheilkunde.)

The cause of this appearance was thought to be an effusion into Müller's radiating fibres, brought on by an optic neuritis, with

subsequent thrombosis of the arteria temporal superior. A cause for the neuritis could not be found. Careful massage of the cocainized globe improved the vision from $\frac{1}{100}$ to $\frac{1}{5}$.

Kingdon, of Nottingham,²² relates the case of a child, 7 months old, who showed signs of gradually increasing muscular weakness, apathy, mental enfeeblement, and loss of sight. Ophthalmoscopic examination showed optic atrophy, with "a cherry-red blotch on a white ground" in the macula of each eye. The child subsequently died, and examination with the microscope of sections taken from the region of the macula showed that "the



OPHTHALMOSCOPIC APPEARANCE OF AN EFFUSION INTO MÜLLER'S RADIATING FIBRES.
(*Centralblatt für praktische Augenheilkunde.*)

layers of cells were less well marked than usual, the alteration being specially noticeable in the layer of pyramidal cells, the majority of which had a single nucleus." The cells did not stain well, and their protoplasm presented a fine, granular appearance. The spinal cord was markedly degenerated.

Tay, of London,²² has seen a fourth case of changes in the yellow spot resembling embolism. This last occurred in a child affected with loss of muscular power. The changes were symmetrical in both maculae. Nothing was found, on section of the retina, but solid œdema of the outer cellular layer.

Five instances of *partial emboli of the retinal vessels* are reported by Perles, of Berlin,¹⁹⁰ making a total of 11 seen by him in a year's time among 10,000 eye patients. Two of these were of long standing, 4 were total or almost total, and 7 involved one or more branches, so that the greater part of the retina remained uninjured. In 6, central vision was wholly or partially retained. In 9 of the cases the origin of the emboli was endocarditis or arteritis of the larger vessels. The author believes that a favorable prognosis may usually be made if the arteries involved pulsate upon pressure, or if there is an unbroken blood-current. He contends that improvement in vision is also a favorable feature, but that the possibility of secondary alterations in the optic nerve renders a favorable prognosis difficult. The therapy adopted in recent cases was energetic massage of the cocainized globe, lasting one to two minutes, once or twice daily. Under this treatment, the author claims to have seen emboli dislodged from a macular branch and carried into a less-important vessel, with resulting improvement of central vision. De Schweinitz, of Philadelphia,⁸¹ has had the exceptional opportunity of studying the changes in an eye-ground, in a case of embolism of the left central artery of the retina, twenty minutes after the onset of absolute blindness. The disc was superficially pinkish gray in color, but distinctly pallid in the deeper layers. A delicate, semi-transparent haze covered the disc, and spread out into the retina in a circular area about a disc's diameter in extent. In the macular region the haze was more milky in appearance, and in the centre there was a typical cherry spot. The two areas of haze were separated by apparently unaffected retinal tissue. The entire arterial system was represented by faint rosy threads, upon which no light reflex could be traced. The shrinking of the arterics perceptibly increased during the examination. The veins were smaller than normal; a moderately rapid circulation was visible in the lower temporal vein. The following day the infiltration of the retina had increased, and the circulation of the vein had ceased. There was faint light-perception. About two weeks later the arteries, with the exception of the inferior temporal, had materially increased in size and central light-perception was more marked. Finally the disc and vessels became atrophic and the macular region contained clusters of cholesterolin crystals. Vision was again reduced to nothing. The patient suffered from mitral

regurgitation. The author gives the notes of two other cases. Fumagalli,¹⁷ has observed three cases of embolism of the central artery of the retina. The author states that this condition is, for anatomical reasons, more common on the left side. A case of questionable *thrombosis of the central artery* of the retina has been seen by Ayres, of Cincinnati.^{84,17} The arteries and veins appeared normal and no obstruction could be detected. When first seen, fingers were counted at 2', whilst the field of vision was represented by a sector below. Four days after the attack vision was normal and the visual field had gradually widened on both sides from below upward, until only a small defect remained above. Ayres, of Cincinnati,³⁴⁷ has seen a typical isolated case of *retinitis pigmentosa* in a colored man 45 years of age. There was no history of consanguinity.

Zirm, of Vienna,³⁵³ reports a case of *subretinal cysticercus*. The condition was thought to be that of retinitis until the correct diagnosis was made, two months later; this was based upon the progressive detachment of the retina and the final discovery of the movements and contour of the parasite. The cysticercus was successfully removed, the form of the globe being retained. Secondi⁵⁸⁹ has removed a subretinal cysticercus in which the vision was reduced to light-perception. After the operation the patient regained almost normal vision.

A case of *traumatic irido-choroiditis* from contusion of the eyeball, ending in the development of intra-ocular glioma, has been seen by Bull, of New York,³⁴⁷ in a 3-year-old girl. Three months after the accident detachment of the retina occurred and was followed by the formation of ciliary and equatorial staphylomata. Three weeks after enucleation was performed a growth appeared on the orbit and the upper cervical glands became enlarged. This was followed, two months later, by involvement of the fellow-eye. Death occurred sixteen months after the time of the accident. Microscopical examination of the injured eye showed gliomatous masses developed in a matrix of exudative tissue.

Rumschewitsch³⁶³ reports a case of *pseudo-glioma* occurring in a girl 12 years old. The vision had been gradually failing for one year. Pain, increased tension, and a gray-white reflex from behind the lens had determined the diagnosis of glioma. The

ball was enucleated. Section of the eye showed a funnel-shaped detachment of the retina, but no tumor growing from it. The microscope revealed an inflammatory process confined to the posterior portion of the orbicularis ciliaris, more marked upon the temporal side; and no trace of inflammation could be found elsewhere in the uveal tract. The author is in doubt as to the etiology of the process. A case of binocular glioma of the retinae was seen by Magee, of Topeka, Kan.,¹⁹¹⁸ in a girl 2 years of age. In the left eye the growth entirely filled the vitreous chamber, and in the right it occupied about two-thirds of the same humor. In a practice of over four thousand cases, Maxon, of Utica,¹⁹³¹ has performed enucleation for glioma of the retina but once, this being in a child five years of age. Fage²³⁰ says that the prognosis of intra-ocular glioma is good if the eye be removed early, and a liberal portion of the nerve excised.

DISEASES OF THE OPTIC NERVE.

Darier, of Paris,¹⁷³ has found that in the *inflammatory processes* of the optic nerve, whatever may be their origin, subconjunctival injections of bichloride of mercury give encouraging results. In simple amblyopia, other than that of toxic origin, which he considers a mild form of retrobulbar neuritis, injections have produced rapid amelioration, whilst in hereditary retrobulbar neuritis the results have been neither better nor worse than those obtained by other medication. The author has also been successful in his treatment of optic neuritis from compression, in syphilitic atrophy (?), and in a case of atrophy secondary to specific choroido-retinitis. Kohn, of New York,²⁴⁹ July has seen *atrophy* of the left optic nerve, in a boy 7 years of age, following a fall upon the corresponding side of the head. Four or five hours after the accident the child became unconscious and remained so for seventy-two hours, during which time there developed symptoms of paresis of the left arm, with loss of sensibility in the thigh of that side and in both calves. A few days later a partial loss of sight was noticed in the left eye. This gradually developed into blindness produced by atrophy of the nerve. Hubbell, of Buffalo,²⁴⁷ believes that there is sufficient evidence to place beyond doubt the claim that both so-called peripheral neuritis and optic neuritis have certain etiological and pathological changes in common.

A family of five men and one woman, all of whom had optic atrophy, which had begun between the ages of 26 and 30 years, was observed by Despagnet.¹⁷³ There was no history of ocular or nervous troubles among the ancestry of either side, and the father had one child by a first wife that was not affected. The children of the second wife were born when the father was somewhat advanced in age and addicted to alcohol. A son of the woman was affected in the same manner at the age of 20 years. All the patients showed the usual changes of optic-nerve inflammation and atrophy, with peripheral contraction of the field and central scotoma. Treatment was not curative, but those of the family who submitted to it enjoyed better vision than the rest. Coggin, of Salem, Mass.,¹⁹² thinks that the ratio of cases of "toxic retrobulbar neuritis" is apparently increasing. Berger²⁴ believes that the cases of partial and complete atrophy of the optic nerve, with a strong history of heredity, described by Leber, are due to an anomalous form of the sphenoid bone, with nerve-changes varying in degree with the amount of pressure exerted by the bone. Anomalies in other bones at the base of the brain would explain the other symptoms. A case of retrobulbar neuritis, of hereditary origin, is reported by Somya, of Berlin.³⁵⁸ The mother of the patient became blind at the age of 34 years, one brother of the mother at the age of 28 years; another, who was under the observation of the author, had retrobulbar neuritis of both eyes; two cousins of the mother had eye trouble,—one had weak sight, the other was blind. There was also a history of eye disease in the family of the maternal grandmother. The case reported was a young man, 18 years old, who had first experienced a diminution of sight six months previously. An interesting fact was the discovery of a noticeable narrowing of the papillary vessels, which, the author says, is usually seen in a later stage. He also believes that there is a proliferation of the connective tissue in and around the central optic fibres, which causes a mechanical narrowing of the vessels, subsequently to which atrophy of the nerve takes place. For a long time the circummacular fibres remain normal, thus allowing a large central scotoma to exist before there is any peripheral contraction of the vision. He considers the site of the disease to be either immediately posterior to or at the site of the lamina cribrosa.

Regarding the treatment of atrophy of the optic nerve and of neuritis, Bacchi, of Paris,⁸² draws the following conclusions: 1. The most efficacious measures known at present are the continuous current of 8 to 10 milliampères and subcutaneous injections of strychnia. The beginning dose of the drug for an adult is 0.001 gramme ($\frac{1}{64}$ grain); it should be progressively increased to 0.01 gramme ($\frac{1}{8}$ grain). For children the initial dose is 0.00025 gramme ($\frac{1}{256}$ grain), ascending to 0.005 gramme ($\frac{1}{16}$ grain). It is wise to delay the treatment of children until the sixth year. 2. Conjointly with strychnia, potassium iodide (1 to 1.5 grammes— $15\frac{1}{2}$ to $23\frac{1}{2}$ grains—per diem, for an adult, and 0.75 gramme—11 grains—for a child) should be administered. 3. The administration of strychnia should be interrupted at the end of two or three months. 4. A careful analysis of the urine should precede the institution of any treatment, and it should be repeated from time to time. 5. If symptoms of intolerance to the drug arise, the treatment should be suspended from ten to fifteen days, the resumption commencing with the initial dose.

A case of *retrobulbar neuritis*, without discoverable cause, is recorded by Burnett, of Washington, D. C.²⁴⁹. The appearance of the discs was at first normal, but later they became white and slopingly excavated, this being associated with an unusual degree of "shot-silk" appearance of the retina. Notwithstanding this condition of the nerves and the reduction of vision to $\frac{2}{5}$, there was an approximately normal field for white. There existed a nearly circular central scotoma for red.

De Schweinitz, of Philadelphia,⁸¹ has made a post-mortem study of a case of *hyaline bodies in the nerve-head*, and believes, with other observers, "that these formations have nothing in common with the choroidal excrescences, but that they are the expression of a pathological process confined to a small portion of the optic nerve, possible on account of local anatomical reasons." A case of *tumor of the optic nerve* is reported by Major,²⁵⁰ in a single woman 23 years of age. The patient had had two attacks of paralysis of the left side of the body and face without loss of consciousness. There was right "synonymous hemiopia," the right pupil being dilated. Death occurred after prolonged stupor. Post-mortem examination showed slight meningitis and a firm, rounded tumor in the posterior portion of the optic thalamus,

pressing on the internal capsule. Microscopically, the growth consisted of a fibrous structure inclosing nests of large, irregular cells. Lagrange, of Bordeaux,¹⁷³ states that all tumors of the optic nerve are located in the more-or-less-distended external sheath, and that the malignant varieties alone tend to invade the cranial cavity by spreading along the sheath. He insists that all tumors, benign and malignant, should be extirpated, and this, if possible, with the preservation of the globe. The steps of the operation are: 1. Division of the external canthus. A thread is passed through each lid to facilitate their separation. 2. Dissection of the bulbar conjunctiva in its external third. Section of the external rectus at its insertion, a thread passed through the tendon of the muscle serving to keep it in view. 3. With the extremity of the index finger and a grooved director the tumor is isolated. In order to disengage the external portion from the orbit, the eye is inclined inwardly. 4. After having isolated the tumor from the neighboring muscles, a Cooper needle, armed with a long and large silk thread, is passed under it, thus obtaining a firm hold upon the neoplasm. 5. With strong curved scissors, guided by the index finger, the orbital entrance of the optic nerve is searched for and divided. This section should be made without cutting the ophthalmic artery. 6. Immediately after this, it is sufficient to draw on the silk loop in order to make the eyeball, the tumor, and the nerve roll out. The cornea is successively carried inwardly and behind, and the extremity of the divided nerve forward. With a cut of the scissors the optic nerve can be detached at the level of the ball and the condition of the posterior segment of the organ examined. 7. After having stopped all haemorrhage and irrigated the orbital cavity with antiseptic solutions, the eye is replaced in its ordinary position, and the rectus externus re-attached at its point of insertion. The conjunctiva is then sutured; likewise the external angle. A small drain will suffice during the first few days to evacuate the unavoidable afflux of fluids.

G. S. Norton, of New York,²⁴⁹ has successfully accomplished the removal of a tumor of the optic nerve with preservation of the eye. The nerve was resected from the nasal side, thus allowing the growth to be brought forward to the conjunctival opening and be dissected off. A glioma of the optic nerve, from a girl 8 years

of age, has been removed by Keyser, of Philadelphia.¹⁰¹⁸ The growth occurred as a thick, hard mass that rendered the eye very prominent. The left eye was strongly converged. Upon the eighth day after enucleation the patient died of meningitis. Post-mortem examination showed the nerve on the right side to be markedly swollen, while that on the left was normal in size within the orbit, but external to the chiasm it was the seat of an almost globular tumor three-fourths inch in diameter. A smaller growth sprang from the right side of the base of the nerve near the pons. Imbedded in the white substance of the middle lobe of the right hemisphere, anterior to the lateral ventricle, was a large cyst having well-defined walls and containing a light, amber-colored fluid. A sarcoma of the optic nerve, occurring in a boy 13 years of age, with no symptoms except gradually-increasing exophthalmos and complete blindness, is reported by Lagrange.¹⁰⁸⁸ The extirpation of the growth was facilitated by the division of the outer canthus, section of the external rectus, and excision of the lachrymal gland; after this had been done the nerve was divided close to the globe and removed by a pair of forceps, this being aided materially by passing a suture through the distal end.

WOUNDS, INJURIES, AND FOREIGN BODIES.

Reeve, of Toronto,⁸⁴⁷ reports a case of *pulsating exophthalmos following trauma*. Both common carotids were tied without affecting the pulsation, which was accomplished by pressure upon the right external carotid. From a study of two cases of *corneal wound with prolapse of the iris*, Greenwood, of Massachusetts,²⁰ concludes that in all cases of marginal wound of the cornea with protrusion of a portion of the iris, where the protruding iris can be successfully replaced, some myotic should be used. Where a portion must be excised, a mydriatic should be employed to get as large a pupil as possible. Grandclément, of Lyons,²¹¹ has seen a case of *regular astigmatism*, the result of a surface burn of the inner third of the cornea. A cylindrical lens of + 3. D. ax. 90 degrees was required to correct the acquired faulty curvature. Reynolds, of Louisville,⁶⁰³ Sept. holds that "no injury to the eye in the nature of a burn should ever be treated by a bandage and compress." Meachem, of Racine,¹⁸⁹ has removed from the cicatrix of a penetrating wound in the eyeball two cilia, which had remained *in situ* nearly

three months before causing irritation. As a barrier against infection of the wounded eyeball, Aschman, of Wheeling,⁶¹ _{Sept. 10} recommends closure of the lachrymal punctum. The author accomplishes this by passing a wire electrode through the punctum, and bringing it to a red heat while *in situ*. He records two cases of hypopyon keratitis in which this plan of treatment gave excellent results.

Santos Fernandez, of Havana,⁴⁵⁹ cites three instances of *shot wounds of the eye*. The first occurred in a man who received a single grain of small shot in the upper portion of the sclerotic, causing temporary blindness. The shot was lodged superficially and made quite a small elevation under the bulbar conjunctiva. One year later it was found to have penetrated more deeply into the sclerotic; the retina had become detached, and there was a patch of choroidal atrophy corresponding to the seat of injury in the sclera. Vision was reduced to $\frac{1}{2}$. A second patient had been struck in the eye by a ball fired from a gun some distance off. Careful examination failed to reveal any perforation of the globe, but there was a circumscribed contusion on the surface of the bulbar conjunctiva that doubtless corresponded to the spot which the ball had struck. Absorption of the aqueous humor, that had become tinged with blood, permitted of excellent vision, and, as there were no other signs of inflammation, the patient was discharged as cured. In the third instance the ball had evidently struck some hard substance before coming in contact with the eye, as it was much flattened when picked up after the accident. The ball had produced a very superficial wound of the bulbar conjunctiva, which healed rapidly under a conservative treatment.

Oliver, of Philadelphia,⁸⁴⁷ gives the history of a case of gunpowder injuries to both corneæ, irides, and lenses, with subsequent restoration of vision to almost full acuity. In the right eye there was a penetrating wound of the cornea, injury to the iris, and traumatic cataract, while the left cornea presented a rather peripheral wound, with a tear in the iris, through which a powder-grain could be seen adhering to the lens. There was a second deep wound of the cornea of the same eye. An attack of secondary glaucoma in the left eye necessitated an iridectomy. Later a capsulotomy was performed in each eye, and a free discussion of the lens was made. The resulting visions were $\frac{5}{10}$. Gonzenbach, of

Basel,²⁵³ describes the clinical features of a case where a fragment of a pistol-cap passed through the iris and vitreous and finally imbedded itself in the choroid. Vision at the first examination was reduced to $\frac{1}{3}$. At this time the piece of metal could be seen in the background, but later it was covered by an exudation mass. Six months after the accident vision had returned to normal and a few floating opacities in the vitreous, with the white spot in the retina, the seat of the imbedded fragment, were all that indicated the previous diseased condition of the organ.

The notes of two cases of gunshot wounds of the eye are given by Ferdinand.⁶ In both cases there was markedly reduced vision, which greatly improved after the absorption of a subretinal haemorrhage. The author makes a plea for the more conservative treatment of similar cases.

Krüger, of Bonn,²⁵⁴ has had two cases of *ophthalmia nodosa*, characterized by intense iridocyclitis, deep corneal infiltration, and the appearance of numerous small nodes in the conjunctiva, sclera, and iris. This condition was caused by the hairs of a caterpillar penetrating these tissues. The animal had been thrown at the patient and had struck his eye, the inflammatory condition immediately ensuing. A microscopical examination of a node excised from the conjunctiva is shown by the plate. It was seated in the subconjunctival connective tissue, encapsulated, and was composed of round-cells. The centre contained four giant-cells, which surrounded a yellow ring, the cross-section of a hair. The second case was clinically and pathologically similar. This patient remembered having slept on a pile of straw in which he had seen numerous caterpillars, and dated the inflammation of the eye from that occurrence. Hamilton, of Adelaide,²⁶⁷ May 15, successfully removed a piece of stone, "about the size of a small pin-head," from the anterior chamber by means of an iris-forceps passed through a corneal wound made with a Graefe knife.

Dividing foreign bodies in the eye into the oxidizable and non-oxidizable, Rouquette²¹² Sept. 11, states that the first class become encysted and for awhile cause no inconvenience, but in the course of time inflammation may be provoked by oxidation. Non-oxidizable bodies—as glass, silica, and lead—frequently lead to suppuration, except in cases of shot, which seem to become aseptic in consequence of the heat imparted to them by the explosion. Coppez,²⁷⁶



Case of Ophthalmia Nodosa.(Krüger)
Archiv für Augenheilkunde.

extracted a piece of iron from an eye, the presence and the position of the foreign body having been diagnosed by means of Gerard's apparatus. Fromaget¹⁸⁸ reports the case of a man who received a blow on the eye resulting in a triangular tear in the iris in its upper outer portion, followed fifteen years later by a cataract, which he supposed to have been the result of the injury. Critchett, of London, Eng.,² records an interesting series of traumatic cases, exceptional in regard to the infliction of the wound. Fig. 1 represents an eye in which a fragment of a copper gun-cap entered at the corneo-scleral margin, and, after passing twice through the iris, remained imbedded in this membrane. The metal, with the portion of the iris including it, was removed, and, the lens having escaped injury, the eye made a good recovery. Fig. 2 is a representation of a shrunken globe that had been enucleated on account of pain. The dart figured in the cut had entered the eye, without the



FIG. 1.—PIECE OF A PERCUSSION-CAP LODGED
IN THE IRIS.

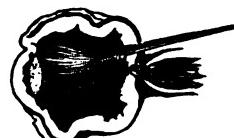


FIG. 2.—DART IN THE EYEBALL.

(*British Medical Journal.*)

patient's knowledge, fifteen months prior to the removal of the organ, and had caused no symptoms until three months after its reception.

Notes of a case in which a piece of steel, after remaining in the iris twenty-seven years, produced symptoms of incipient sympathetic inflammation is reported by Keiper, of Lafayette, Ind.⁵⁶ The foreign body was extracted, and there was no inflammatory recurrence.

Oliver, of Philadelphia,¹¹² gives the clinical history of a case of successful extraction of a piece of steel from an iris and lens by an iridectomy, with subsequent absorption of the lens and recovery of normal vision. The case is interesting on account of the immediate curative effects of an iridectomy which removed an offending substance and its bed of bruised and inflamed iris-tissue, thus allowing a free, rapid swelling and disintegration of lens-matter to take place uninterruptedly, during a watchful and careful after-

treatment; this immediate happy result being supplemented by a subsequent restoration of vision to full acuity, with but little necessary correction of astigmatism in a comfortable and unirritated organ. The successful removal of a piece of steel from the anterior portion of the vitreous is cited by Fisher, of Philadelphia.⁸⁰ An effort was first made to remove the foreign body together with the cataractous lens, but in the attempt it became lodged against the ciliary body, from which position it was extracted by means of the electro-magnet. To facilitate the removal of such bodies, the author suggests having an assortment of spoons and loops of steel that can be attached to the core of an induction coil. Buller, of Montreal,³⁴⁷ has observed a case of foreign body in the retina, where the offending substance became surrounded by a zone of opacity, which later increased in size and became atrophic. Neuroretinitis with hyalitis supervened, and the piece of steel disappeared from view, its former location being marked by a small patch of pigment.

An instance of atrophy of the optic nerve, following a penetrating wound in the fellow-eye, is reported by Lopez, of Mexico.¹⁷⁹ There was a history of a small fragment of iron having pierced the sclerotic of the left eye, and having become lodged between the disc and the macula. Some days after the accident, the patient, not feeling any discomfort, resumed work, in full possession, as he thought, of his visual functions. Five months later he discovered that the right eye had lost its power of vision to such an extent that in working he was obliged to rely upon the left eye. There had been no pain, no injection or lachrymation, no photophobia or photopsia in the right eye. The vision was soon reduced to such an extent that light-perception only was possible. Examination showed that the disc was uniformly white, and that the vessels were diminished in size. There was a well-advanced cataract in the wounded eye, having the coloration of sesquioxide of iron, that prevented a thorough examination of the fundus. Its extraction was accomplished with a resultant vision of one-fourth. Five months after the operation the patient returned, complaining of loss of visual power and increased sensibility in the operated eye. The least pressure produced pain. An examination revealed a change in the coloration of the cornea, which appeared somewhat pale, and also of the tint of the sesquioxide of iron. This veiling was occa-

sioned by innumerable particles, irregularly shaped, which had lodged themselves between the layers of the cornea. Vision became reduced to the perception of light, and the coloration gradually extended to the conjunctiva.

In confirmation of the fact that wounds in the sclerotic, the result of a trauma administered by blunt instruments, are usually situated superiorly and to the nasal side, Fernandez⁴⁵⁹ _{No. 18} reports a case of a man who was struck on the closed eye with a wedge of wood. The sclerotic was ruptured and the iris was collapsed into the wound. The eye was dressed antiseptically, and after two weeks' time the prolapsed portion of iris was excised, with an excellent resultant visual acuity. A case in which the sclerotic was indirectly ruptured and the vitreous exposed, as the result of a kick from a horse upon the lower lip, is reported by Puech.¹⁸⁸ _{Dec. 18, '91} A case of rupture of the eyeball, involving the cornea and sclera, with prolapse of a small portion of the ciliary body, is reported by Dunn, of Richmond, Va.⁸¹ _{July} The eye recovered with a visual acuity equaling one-half. The same author reports a second case of rupture of the ball with prolapse of the ciliary body. Subsequent shrinking of the globe with supervention of sympathetic ophthalmia, occurred two and a half years after date of injury. The exciting eye was enucleated and, later, an iridectomy was made in the sympathizing eye without arresting the disease. Stoewer²⁵⁴ _{Mar.} saw the iris and lens disappear in an eye that had been struck with a piece of wood, but where there was no external wound large enough to permit of their escape. The author inclines to the view that they were absorbed, although the short space of time that had elapsed since the injury would detract from this idea. By dividing an anterior synechia of twenty years' standing in the exciting eye, Sinclair, of Memphis,⁷⁴ _{Dec. '91} has obtained complete relief from a severe sympathetic irritation.

A case of a blacksmith who lost one eye as the result of an injury by hot iron is reported by Drocoulides, of Constantinople.¹⁷³ _{July} For twenty years there were no symptoms, when suddenly pain and other inflammatory signs appeared in the injured eye, soon followed by intense irritation in the other. Enucleation of the exciting organ produced recovery of the sympathizing eye. Wishart, of Toronto,²⁵⁷ _{Mar.} is of the opinion that, in sympathetic ophthalmitis, the causal influence is a nervous one. Carmalt, of

New Haven,⁹⁹ considers it unjustifiable to remove an injured but still seeing eye, not containing a foreign body, for the purpose of arresting a threatened or prospective attack of sympathetic disease in the fellow-eye. Altabas, of Barcelona,⁹⁸¹ says that he has seen sympathetic irritation take the form of a retrobulbar neuritis, with a well-marked central scotoma. Under brisk mercurial inunctions vision bettered and the scotoma grew smaller; but the disease began to manifest itself in the anterior segment of the globe in the form of an iritis. Mercurial and tonic treatment, conjoined with the occasional use of atropine, were persisted in, with final resultant vision of $\frac{1}{2}$. There was an entire disappearance of the scotoma and all signs of inflammation. Ryerson, of Toronto,⁸⁷ has seen sympathetic blindness brought on by the irritation set up by a retrobulbar tumor in the other eye. The same author describes a second case, where optic atrophy had been caused by a shrunken stump.

A case of sympathetic irritation, in which the excited eye had been shrunken from the results of an injury received over fifty years previously, was seen by Wishart, of Toronto.³⁹ In a case of sympathetic irritation reported by McDermott, of Cincinnati,¹⁰³ the irritation was excited by an eye containing a cataractous lens which had been dislocated into the vitreous thirty-five years previously. A case of sympathetic irritation, excited by an eye containing a dislocated calcareous lens, is reported by Walker, of Bristol.⁶ Thirty-four years previously the sight of the eye had been destroyed by a gunshot injury. Cramier, of Cottbus,⁵⁵² has seen a peculiar diminution of vision, caused by a foreign body moving within the eye. The substance had remained in the eye nearly two years without causing any symptom. The ophthalmoscope showed the vitreous slightly hazy, with evidence of a previous chorio-retinitis inferiorly. The retina was detached, and there was a small dark fragment imbedded in the vitreous and surrounded by a raised portion of the retina; the next day this body disappeared. The vision would improve after a rest of several hours in a dark room, which exposure to light would soon diminish. The author believes that the motions of the eye had finally dislodged the fragment, and that this, in conjunction with the light stimulation, had caused a torpor of the retina.

De Wecker, of Paris,¹⁷¹ believing that sympathetic ophthal-

mia is infectious in its nature, and that the optic nerve is the only path along which the infecting material can be carried, claims that a simple resection of this nerve will in many cases be sufficient to avoid the disease. The author knows of no symptom by which one might differentiate the disease from any of the other forms of irido-choroiditis, and states that, although wounds in the ciliary region are to be feared, scarcely one in twenty is followed by sympathetic ophthalmia. Valude, of Paris,¹⁵² states that enucleation is the only trustworthy operation, and reports a case in which resection of the optic nerve did not prevent sympathetic ophthalmia. Buller, of Montreal,¹⁰⁰⁷ is prepared to maintain that "the eye of a child should never be enucleated on account of an injury unless sympathetic ophthalmia has actually occurred." Claiborne, of New York,⁴⁰ asserts that there is but one principle to be remembered in connection with sympathetic ophthalmia, and that is, if the vision of the exciting eye is lost as the result of an injury, the eye should be removed.

A case of sympathetic irido-choroiditis relieved by the removal of the exciting eyeball, containing a globular osseous mass springing from the optic-nerve entrance, is reported by Burnett, of Washington.²⁴⁹ Three cases of enucleation are reported by Connor, of Detroit.⁸⁴⁶ The first was interesting on account of a severe illness accompanied by a very irregular temperature, that followed the operation. Enucleation was rendered necessary in the second case on account of the eye being literally gouged out by a fellow-workman; whilst the third case merited being reported by reason of an orbital abscess which developed after the surgical interference.

Kalt¹⁷¹ records two deaths following enucleation for chronic panophthalmitis. The first case was one of extensive infectious ulceration of the cornea. Twenty-four hours after enucleation the patient had a chill, temperature 39.5° C. (103.1° F.), although the wound was healthy and there was no swelling or pain. The lips of the wound were separated and the cavity irrigated with bichloride-of-mercury solution. The following two days there was fever, attended with violent headache and slight delirium; on the fourth day coma and death followed. The autopsy disclosed a purulent subarachnoid exudate on the convexity of the brain. A microscopic examination of the meninges revealed a pure cul-

ture of the pneumococcus. In regard to the causation of the meningitis, the author has two hypotheses: that the pneumococcus either traveled from the eye to the subarachnoid space by an unknown route, or that the micro-organisms followed the venous paths, in the form of emboli. He thinks that it is quite plausible that the manipulation to which the eye had been subjected during the operation might have forced fragments containing the pneumococci into the circulation. It is true, no pneumococci were found in the eye, but cultures would have been necessary to demonstrate their absence. In the second case, meningitis set in seventeen days after the enucleation, and death followed in forty-eight hours.

In an eye enucleated on account of panophthalmitis, caused by an infected wound of the vitreous, Perles, of Berlin,¹⁹⁰ discovered colonies of rod-shaped bacilli, about the size of the typhus bacillus, but somewhat thicker in the middle, with pointed ends, and others that were comma-shaped. There were also colonies of spores. The bacilli stained a deep red with hot carbol fuchsin, but the spores remained uncolored by this agent. Although the operation gave local relief, there remained a general malaise, with an evening rise of temperature, unaccounted for by any evident systemic disease. Microscopical examination of the blood revealed the presence of the same spores and bacilli as were found in the eye. From these facts the author arrives at the conclusion that there had been a systemic infection.

Fage¹⁷⁸ believes that exenteration should be performed in preference to enucleation, in cases of panophthalmitis, where the infectious process has not passed beyond the globe. He also thinks that the operation is indicated in eyes lost by irido-choroiditis, hydrophthalmos, grave glaucoma, opaque adherent staphyloma, and wounds, provided that the organ is not the seat of serious pain or marked irritative phenomena, in which case there should be recourse to enucleation.

In a case of panophthalmitis, Monod¹⁸⁸, July 17, has successfully practiced enucleation in preference to other modes of treatment. Differing from Boé in enucleation for panophthalmitis, Valude¹⁵², November 24, advocates the procedure because he has seen death result from general infection where no operation was performed. The almost complete absorption of a haemorrhage into the vitreous, as the

result of a traumatism, is reported by Ferron.⁷⁰ Prager, of Wieden,⁸⁰ describes the removal of a *cysticercus cellulosa* from the anterior chamber. The parasite was detected early, and its subsequent growth was observed during seventeen days, in which time it had increased in size from a mere speck to one millimetre in diameter; five days previous to the first examination there were well-marked local irritative symptoms, which led the author to think that this was the time of the entrance of the parasite into the globe.

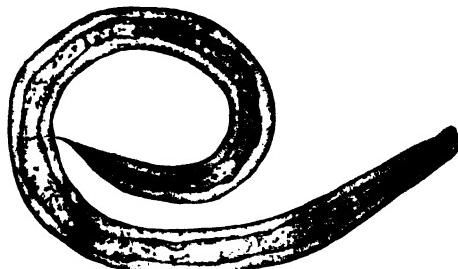
A case of enucleation for phthisis bulbi, produced by traumatism eleven years previously, which, in addition, caused facial paralysis and gradual decline of the senses of taste and smell, is described by Becton.⁸¹ Whilst the patient was delirious, after an attack of secondary haemorrhage, which occurred on the fifth day, he used Scotch dialect, though not having been in Scotland since the age of $3\frac{1}{2}$ years. Another point of interest was the restoration of the senses of smell and taste. Schmidt-Rimpler, of Goettingen,⁸² has seen sympathetic ophthalmia develop from an eye in which he had done a section of the optic and ciliary nerves after a sclero-corneal wound. Bacteria were not present in the enucleated globe nor in its optic nerve. The nerves in the ciliary body and in the cornea were likewise found intact. He believes this case to be against the migratory theory.

The following is the method employed by Chisolm, of Baltimore,⁸³ in performing resection of the optico-ciliary nerves: After anaesthetizing the patient, a horizontal incision is made in the conjunctiva, extending from the lower inner border of the cornea to near the caruncle. The capsule is then opened and an instrument terminating in two small hooks is passed into the depths of the wound and inserted well back into the sclerotic; the eyeball is then forcibly rotated outward, and the enucleation scissors, with closed blades, are introduced until they meet the optic nerve, when they are drawn forward, the blades allowed to open, and the optic nerve and its entire surroundings completely divided. A firm compress is immediately applied. From his experience with the operation, the author feels assured that in suitable cases it is far preferable to enucleation.

Upon the theory that the sclerotic is not involved in so-called panophthalmitis, and that the vitreous is fluid when it is

purulent, Chibret, of Clermont-Ferrand,¹⁷¹ makes use of a procedure that has given him excellent results in eighteen cases. He detaches the cornea along the interior half of the limbus with the point of a Graefe knife, and tears away any occlusions of the pupil or of the capsule of the lens. The lens often escapes at once, accompanied by pus. A syringe, provided with a large cannula filled with cyanide of mercury, 1 to 5000, is introduced into the wound, and the interior of the eye is washed until the issuing fluid is clear. The author claims that fever and pain disappear in from twenty-four to forty-eight hours. Poultices may be used to reduce the chemosis. If the inflammation has existed longer than from two to three weeks, this procedure need not be tried, as enucleation is indicated.

A unique case of dislocation of the eye of an infant, following a forceps delivery, was observed by Beaumont, of Bath.²⁶



PARASITE REMOVED FROM AN EYE.
(*Archiv für Augenheilkunde.*)

The lids were retracted and hidden behind the protruded globe, the conjunctiva was chemosed, and the cornea dry and steamy. Reduction of the dislocation was easily accomplished. Ten days later, the only evi-

dence of the injury was a slight opacity of the cornea.

The accompanying cut represents a thread-like worm of uncertain species that was removed from an eye by Kuhnt,²⁵⁴ after he had observed the progress of the case during a period of six months. The patient had consulted him on account of a peculiar stinging sensation, which, the patient said, seemed to cloud his vision in the right eye. The ophthalmoscope revealed a shining, white spot, a pin's head in size, occupying the fovea centralis. The subsequent rapid increase in size, the detachment of the retina, the detection of motion in the mass, that had now worked its way into the vitreous, and the presence of photopsia and chromatopsia, convinced the author that he had to deal with a parasite, and that its removal was indicated. This latter was accomplished, with resultant vision of counting fingers at five metres.

Dianoux, of Nantes¹⁷³ treats all cases of penetrating wounds of

the eye as though they were infectious, and recommends that they be washed very freely by some aseptic fluid. Suppuration is combated by the thermo-cautery. Dianoux, of Nantes, ¹²⁷ believes that the thermo-cautery is the most reliable means of destroying infection in wounds of the eye, lavage with antiseptic solutions being a valuable adjunct. The author states that the probability of infection is in inverse ratio to the size and regularity of the wound, a large wound with regular edges permitting the aqueous humor to wash away the infecting germs.

Minney, of Topeka, Kansas, ¹⁰⁰⁷ July reports two cases of calcareous formations in the eye, following injury. In the first instance the lens was the seat of this change, while in the second the posterior half of the eyeball had become completely calcified. On account of failing vision, Leplat, of Liége, ²⁸³ Nov. 11 removed a small lamina of iron from the anterior chamber that had been *in situ* for five years without causing any symptoms. Barrett, of Victoria, ²⁸⁵ Apr. 15 cites an instance of attempted removal of a foreign body in conjunction with a cataractous lens, that had been rendered soft by discussion. The attempt was apparently unsuccessful, as no trace of the foreign body could be found.

Armaignac, of Bordeaux, ¹⁸⁸ regards the use of cocaine in enucleation as fraught with danger and inconvenience, and reports a case where the local anaesthesia was almost *nil*, and where the heart was for a time influenced unfavorably. Hirschberg, of Berlin, ¹⁹⁰ gives the following rules for locating the position in the sclera of the incisions made to remove foreign bodies from the interior of the globe: (1) the measurements of the human eye are to be carefully considered; (2) the extent of the visual field and the findings of the ophthalmoscope are to be carefully studied.

Relying on the well-known tolerance of the orbit for foreign bodies, Gould, of Philadelphia, ⁹ has inserted artificial eyes within one week after the enucleation, without any bad results. J. W. Thompson, of St. Paul, Minn., ⁶¹ urges the importance of a cultivation of the muscular sense in ophthalmic surgeons. In some instances, Ryerson, of Toronto, ⁹ Jan. 10 states that he orders artificial eyes to be inserted within seven or eight days after enucleation has been performed, but he advises against the constant wearing of them until two weeks later.

GLAUCOMA.

Richey, of Washington,⁸⁷ believes that the prime etiological factor of glaucoma is constitutional. He considers chronic glaucoma to be "a neurosis, the origin of which is due to absorption of toxic substances from the intestinal tract, the result of indigestion; that the true etiological factor—local irritation or a trauma—excites an attack of glaucoma only in the presence of the dyscrasia; that operation saves the eye during a paroxysm; that operation serves little purpose in chronic glaucoma, even when it does not, by irritation, precipitate a paroxysm; that chronic glaucoma is a neurosis, a progressive atrophy, with the feature of inflammation with defective power, varied by periods of apparent rest; that correcting and controlling individual habits, especially in the character and amount of food taken, will do more to preserve vision than operation; that there may be a possibility of aborting chronic glaucoma if the tendency to it be recognized at an early stage." Schnabel⁸⁴ maintains that the constant lesion in glaucoma is an interstitial neuritis, and that in many cases an excavation is not found, as the part affected is the extra-ocular portion of the opticus, which is exposed to increased intra-ocular tension. He recognizes this retrobulbar neuritis ophthalmoscopically by the grayish-red color of the optic fibres, and by the excavation which often appears very late. By this theory he explains those cases of glaucoma in which peripheral and central vision is retained. In an eye affected with acute glaucoma, the author found the lamina cribrosa normal, although there was well-marked retrobulbar neuritis. The intra-ocular fibres were infiltrated by small cells and replaced by connective-tissue fibres. The inflammation, he thinks, may also lead to degeneration of these latter.

Ramous¹⁷⁹ refers to two cases illustrating the non-liability of children to glaucoma. In one instance the lens was absorbed, following dislocation into the vitreous. In the second case the crystalline lens had been dislocated for some time, without showing any glaucomatous signs. This patient was treated as though suffering from aphakia.

Two cases of buphthalmos have been observed by Harlan, of Baltimore.¹⁰⁴ The first occurred in an 11-year-old girl. Both eyes had been affected since birth. The cornea of the one eye was opaque and all light-perception had been lost. The fellow-eye

was normal in appearance except in its enormous enlargement. The second case was seen in a negro man. The vitreous and lens were opaque and the cornea was cloudy. The eye was enucleated and found to have a diameter of $1\frac{1}{2} \times 1\frac{1}{4}$ inches. Fernandez, of Havana,⁴⁵⁹ _{No. 12} reports a case where the diagnosis between iritis and acute glaucoma was only rendered certain by a view of the fundus, gained after iridectomy. The patient gave a history of violent pain in the eyes and parietal region, a year previous to the operation, which her physicians diagnosed as neuralgia and treated as such. After a time the pains abated, but the sight became so bad that only perception of light remained. Examination showed a purulent conjunctivitis. The cornea was normal; the pupil was dilated to some extent and the iris did not react to light. The intra-ocular tension was normal. A view of the fundus could not be obtained. There was a gouty diathesis. Although the symptoms pointed more to a case of iritis complicated with choroiditis, nevertheless the author made a diagnosis of glaucoma. Iridectomy was performed, and through the coloboma the author was able to see the glaucomatous cupping of the disc.

Lewis,⁴⁶⁰ _{Supt.} makes some very useful remarks to the general practitioner upon glaucoma, giving in plain words an excellent résumé of its diagnosis, prognosis, and treatment. This work is based upon a consideration of the propositions that "contraction of the field of vision, in glaucoma, is a feature more or less marked in all forms of the disease; that it is progressive; that it increases with the increase of tension, and decreases as this symptom decreases; that the fixed contraction is in direct relation to the cupping of the disc, as a rule, though exceptions may occur; that the contraction bears a certain relation to the distribution of the filaments or fibres of the optic nerve; and that the distribution, relation, and structure of the rods and cones is a factor to be considered in the contraction of the field." Price, of Nashville,¹⁰⁰⁷ _{Mrs.} concludes that "the fixed contraction of the field of vision in glaucoma is dependent upon (1) a break in the continuity of the optic-nerve fibres and the layer of rods and cones, due to tension; (2) changes in the layer of rods and cones, produced by long pressure." Pusey, of Louisville,²⁴⁰ _{J.S.} reports two cases of glaucoma. One, a young man aged 17 years, with the condition in both eyes, stated that his sister, brother, mother, his mother's uncle, and his maternal uncle

were all "blinded by neuralgia"; whilst the other, a boy 13½ years old, had glaucomatous excavations in both nerves, with arterial pulsations and contracted visual fields. The patient's brother, sister, father, and father's mother were all blind from the disease. Pomeroy, of New York,¹ has carefully analyzed twenty cases of glaucoma, in which thirty-two eyes were affected, showing the value of the various operative and therapeutic methods employed in their treatment. He has used eserine in varying strengths without once causing iritis, and only occasionally inducing pain. He has found the drug useful in cases of acute inflammatory glaucoma and in most cases of the chronic inflammatory type of the disease, before, during, and after operation; and in absolute glaucoma it often succeeded in relieving pain, reducing tension, and indefinitely warding off operation. Paracentesis of the cornea proved to be successful, in a degree, in temporarily relieving pain and decreasing tension in all forms of the affection, and was found to be free from danger. Although having met with many hundred cases of simple chronic glaucoma in a practice of twenty thousand Chinese patients, Hopkins, of Tsunhua, China,²³⁵ has failed to see a single instance of the acute inflammatory type. Hall, of Allahabad,²³⁹ justly concludes that eserine is insufficient in acute glaucoma, iridectomy being the only reliable remedy. Woodward, of Burlington,¹⁰⁰⁷ asserts that he has seen pulsation of the retinal arteries follow the instillation of atropine in an eye in which the lens was dislocated downward and backward. The withdrawal of the mydriatic was followed by cessation of the pulsation.

In order to avoid the danger of dislocation of the lens in performing iridectomy for glaucoma, Neve, of Cashmere,²³⁹ states that he is in the habit of making an incision "about five millimetres in length from corner to corner." Lopez, of Mexico,⁷⁷³ has had a case of haemorrhage from a glaucomatous eye in a man aged 40 years, who was being operated on for iridectomy. The lens, appearing in the wound, was extracted, followed by a gush of vitreous and a quantity of blood. Compression was necessary to stop the haemorrhage. A final examination showed the cicatrization to be complete and the form of the eye to be preserved, but the dilated pupil was still obstructed by a mass of coagulum. In a clinical and pathological study of four cases of haemorrhagic glau-

coma, Valude and Dubieff, of Paris,¹⁷⁸ have found the retina to be the primary seat of lesion ; its vessels showed hyaline degeneration in some instances, while in others there were evidences of more advanced sclerosis, with general circulatory degeneration. Lagrange¹⁸⁸ reports a case of glaucoma following a non-penetrating wound of the eyeball. Stretching of the external nasal nerve was followed by cessation of the symptoms. Knapp, of New York,²¹⁰ reports ten cases of glaucoma following discussion of secondary cataract. All the cases were promptly cured by an iridectomy. He says that the occurrence of 1 per cent. of glaucoma after discussion will not induce him to modify the method which he prefers for cataract extraction, *i.e.*, simple extraction, with peripheric opening and subsequent discussion of the capsule.

Pooley, of New York,⁷⁷⁶ has had iridocyclitis with consecutive glaucoma follow an operation for secondary cataract, during the performance of which there was an escape of vitreous. The primary operation was made with an iridectomy. Raynaud⁴⁶ asserts that anterior staphyloma complicating glaucoma is due to a diminished resistance of the fibrous envelope of the eye at the sclero-corneal junction, and that the treatment of the prodromal stage of glaucoma and in the developed disease should be directed against the arterial sclerosis at the root of the affection. Truc¹⁷³ believes that there is a sympathetic glaucoma, and cites a case in which the enucleation of a glaucomatous eye was followed by improvement in the fellow glaucomatous eye.

SECTION V.

MEDICAL OPHTHALMOLOGY.

Trousseau, of Paris,³⁷⁸ calls attention to the influence of general disease upon the eye, believing that chronic and nervous disorders exert the greatest influence. Hull, of Chambersburg, Pa.,⁷⁶⁰ contributes a very interesting article, demonstrating the importance of ophthalmology as diagnostic of general disease. Leonard, of St. Joseph, Mo.,¹⁹ draws an analogy between circulatory disturbances in the brain and eye due to increased intracranial and intra-ocular pressure. Venneman¹⁷¹ calls attention to the exaggeration in the normal bending of the retinal arteries toward each branch they give off, in valvular diseases and in central

functional palpitation. He ⁸² has studied the genesis of the pulse and formation of flexures in the retinal arteries, especially in their temporal branches. He has seen the latter condition in many cases of frequently repeated attacks of cardiac palpitation, and he considers—all known organic causes being eliminated—that it is diagnostic of nervous palpitation. Alleman, of Brooklyn, ¹ gives a succinct description of the diagnostic symptoms of the graver ophthalmic diseases which frequently come under the experience of the general practitioner.

Hartridge, of London, ² considers the arc-light unsuitable for in-door illumination, because of its intense brilliancy, unsteadiness, and because it contains a large proportion of the violet and ultra-violet rays, which, though probably absorbed by the media of the eye before reaching the retina, cause a certain amount of fatigue. He says that "the incandescent light may be used with advantage for in-door illumination, since its composition compares well with sunlight; while containing but few rays belonging to the red end of the spectrum, it has fewer violet and ultra-violet rays than the arc-light; it is very steady, and can be turned off and on in different parts of the room, according as the light may be required."

Much stress is laid by Fage²³⁰ on the causative relations of *nasal and post-nasal affections*, with phlyctenular kerato-conjunctivitis, and on the necessity of proper treatment of the primary affection. Kalt¹⁷¹ has recently observed a case of *tonsillitis*, with pressure on the jugulars, to cause œdema of the eye. Percepied¹⁵² reports three cases of phlyctenular conjunctivitis, occurring in *pertussis* and associated with epistaxis on the same side. The author considers this additional evidence that the phlyctenular conjunctivitis is often secondary to some nasal trouble. Guillemain and Terson, of Paris, ¹⁰⁰ state that the most common condition of the periorbital sinuses giving rise to ocular symptoms is suppuration, due usually to infection by micro-organisms from the nasal chambers. Treatment consists in trephining and thorough evacuation of the pus. In a case of primary *cancer of the breast* observed by Zirm, of Vienna, ⁸ there was a diffuse infiltration of the anterior parts of the orbits, which caused an almost absolute fixation of the globes. The lids were also shortened to such a degree that they did not completely cover the eyeballs. In many cases of

"ophthalmia" associated with *la grippe*, Cullimore, of Omaha,¹⁰⁸ claims that he has seen a congestion of the optic nerve. Fernandez, of Havana,⁴⁹ reports the following instances of ocular trouble traceable to the influence of influenza. The first occurred in a woman, who lost her sight at the height of a fever. An abatement of this latter was followed by restoration of the vision. The author believes that the blindness was caused by a spasm of the retinal blood-vessels. During convalescence from an attack of the disease, the second patient, who had lost the sight of the left eye twenty years before, noticed that the vision of the right eye became clouded and that objects appeared red, particularly when he lowered his head. When he assumed the upright position the symptoms disappeared. Later on, however, vision became very dull, and at times the patient saw small, red points. The ophthalmoscope revealed nothing pathological, beyond a few vitreous opacities. The next case was one of corneal ulceration, due, the author suggests, to the bad influence of the disease upon the general system. In another case a violent muco-purulent conjunctivitis was set up, first in the left eye (which had been operated on, years before, for glaucoma) and five days later in the right eye, from which a cataract had been removed, also at a period remote from the inflammation. In another instance there had been a relapse of acute granular conjunctivitis at the end of an attack of influenza. In the two remaining instances vision became cloudy, probably as the result of a superficial ulcerative keratitis.

From the study of twenty-seven reported cases of papillary and retrobulbar neuritis, following influenza, Antonelli¹⁷⁸ draws the following conclusions: 1. The virus of influenza may attack the optic nerve in its papillary or in its retrobulbar portion. 2. The ocular lesions of influenza may be divided into those produced by infection from the exterior and those caused by metastasis. To the latter class belongs optic neuritis, being analogous to that form occurring in the course of typhoid and scarlet fevers, and diphtheria. It is possible, however, that cases of intense inflammation may be due to local infection proceeding from the nasal passages. 3. The papillitis due to influenza appears in from three to fourteen days after the commencement of the disease. 4. Retrobulbar neuritis is more common than papillitis or neuroretinitis. It differs from the neuritis due to alcohol, tobacco, or lead, in that it

presents an acute or a subacute form, marked by a rapid and progressive diminution of vision. The author believes that the prognosis should be guarded, improvement being slow, sometimes, though exceptionally, being complete. During the acute stage, leeches to the temples, absolute rest, injections of pilocarpine, quinine, and salicylates internally, should be employed. In the later stages, he says that iodide of potassium, the continuous current, injections of strychnia into the temples, and mercury are indicated.

Two cases of double optic neuritis after influenza are reported by Snell, of Sheffield,². The patients were both females, aged respectively 19 and 13½ years, and in each case sight began to fail a few weeks after recovery from an attack of grip. In both instances the nerves became atrophic. Lee, of Liverpool,¹⁸⁷ reports a case of optic neuritis followed by atrophy of the discs, also due to influenza, in a man 60 years of age. Hodges, of Leicester,⁷⁶ reports a case of tenonitis following an attack of the same disease, in a woman aged 44 years. Upon account of the severity of the symptoms the eye was enucleated. From a careful examination of the specimen, Treacher Collins believes that there could be very little doubt but that the extra-ocular changes were inflammatory, and very likely began as tenonitis, which spread outward to the cellular tissue of the orbit and inward to the choroid and ciliary body, the inflammatory changes in which have produced shrinking of the vitreous and detachment of the retina. Otto,⁴¹ has studied the effects of *diseases of the carotid and ophthalmic arteries* upon the optic nerve and its head, and says that the anatomical relationship of the ophthalmic artery to the nerve is such that diseases of the former would naturally cause changes in the latter. Only in cases, however, of marked disease of the arteries has he found any observable change in the nerves.

Bing,⁷⁰⁰ reports a case of syncope followed by profuse perspiration, produced by a weak solution of cocaine given for the removal of a piece of emery from the cornea. A case in which a spontaneous intra-ocular haemorrhage had taken place in an apparently healthy 16-year-old boy, followed by no local symptoms save blindness, is reported by Guyot.⁴⁵⁴ Microscopic examination of the eye, removed two months later to prevent sympathetic irritation, showed an extensive irido-choroiditis with extravasation of blood and many leucocytes into the vitreous.

Somya, of Berlin,¹⁹⁰ reports three cases of partial atrophy of the optic nerve, secondary to *hæmatemesis*. The author believes that, where complete blindness follows such a hæmorrhage, the pathology is a primary fatty degeneration of the optic fibres from local anæmia. When, however, the anæmic condition has not been so great nor so prolonged as to cause total blindness, a sort of regenerative inflammation occurs by which the nerve-fibres already degenerated are rendered more capable of carrying impulses, whilst those not affected are protected from degeneration. Knapp, of New York,²⁴⁹ adds a case in which the ophthalmoscopic appearances were similar to those in the case reported by Plange (ANNUAL, 1892, vol. iv, B-93) from Nieden's clinic. In a patient in whom gradual blindness followed a very severe attack of vomiting, there was seen lying on the choroid a system of dark-brown or black streaks, radiated in the vicinity of the optic disc in every direction and varying considerably in thickness. In a few places the bands contained sections which were of a red color. The nerves were atrophic, and the refraction of the eye was myopic. The author is convinced that the vessel-like streaks were of hæmorrhagic origin. Bagnéris⁵⁷⁷ records a case of *retinal ischaemia*, accompanied by blindness and followed by cure. Hilbert³⁵³ reports two cases of *erythropia*, where there were normal refracting media, good vision, and no pathological conditions. The one, a woman aged 55 years, had had frequent attacks of profound hysteria. The cause of the erythropia was probably central, produced by a severe fright during a thunder-storm. The other, a male aged 38 years, an astronomer, also neurasthenic, was attacked while observing an eclipse of the sun. The author believes the phenomenon in this case to have been caused by the intense peripheral irritation.

Mittendorf, of New York,¹⁵⁰ describes several cases of *sudden monocular blindness*. In some this condition was caused by retinal hæmorrhages dependent upon apoplectic or rheumatic conditions; in others, the hæmorrhage was caused by increased intra-ocular tension, produced by gastro-intestinal disorders or cardiac disease. In a patient affected with migraine, there were trophic disorders of such degree that atrophy of the optic nerve ensued. He says that, in many cases, the hæmorrhage occurs in the retrobulbar portion of the optic nerve, or its sheath, and

that blindness is caused in other instances by pressure from retrobulbar haemorrhage, secondary to a fracture of the skull, involving the optic foramen. Two cases of the latter are given. The author cites, as other etiological factors of this condition, (a) the pressure exerted upon the optic nerve by the increased intra-ocular tension coincident with acute glaucoma; (b) the decreased tension, such as accompanies detachment of the retina or follows iridectomy for glaucoma; (c) the concussion of the globe.

Risley, of Philadelphia,⁸⁰ reports four cases of eye disease apparently due to *rheumatism*: 1. Paresis of the external rectus, where a purge and Turkish bath removed the trouble. 2. Conjunctivitis, which resisted all local remedies, but disappeared with the subsidence of an attack of acute articular rheumatism. 3. Asthenopia, which the proper correcting glasses failed to relieve, but which disappeared after a "rheumatoid" attack. 4. Iritis, in which a proper dose of salicylate of cinchonidia gave almost immediate relief, though all other measures had failed.

Trousseau, of Paris,¹⁷¹ does not believe that *consanguinity* plays such an important rôle in the causation of congenital cataract as is usually believed. He reports a series of observations upon albinism and retinitis pigmentosa, and doubts the influence of consanguinity as a causal factor in their development. Kollock, of Charleston,³⁴⁷ has seen amblyopia of the left eye in two sisters and two brothers of the same family. In the first, a female aged 27 years, there was disseminated choroiditis and other physical signs of inherited syphilis; in the second, a male 30 years of age, there was a coloboma of the nerve, but no signs of inflammation; in the third, a female 47 years old, there was nothing to account for the amblyopia other than a hyperopia of between 3. and 4. D.; and in the fourth case, a male aged 50 years, no gross changes were present.

Hill, of Memphis,⁷⁴ has seen a case of *specific iritis*, in a man 60 years of age, appearing forty-two years after the appearance of the initial lesion. Florence Mays, of Philadelphia,¹⁹ has seen iritis, gumma of the iris, hypopyon, keratitis punctata, and papillitis in a young man, aged 19, who had had an initial lesion six months before. A case of specific choroiditis, with hazy vitreous and questionable neuritis, is reported by Barrett, of Victoria.²⁸⁵ Under antisyphilitic treatment, the author saw patches of choroiditis pass

from an active to sclerotic and atrophic conditions. In an article upon "Vasculitis in Hereditary Syphilis, and the Condition of the Vessels in the Retinitis of Congenital Syphilis," Spicer, of London,²² states that in these affections the ophthalmoscope showed faint white lines on each side of the vessels, beginning at or near the disc, which gradually increased in thickness toward the periphery. In slight cases, the veins were most affected. In acute cases, the vessels were entirely obliterated and were converted into white threads. These changes were associated with a diffuse retinitis and superficial disturbance of the choroid. Microscopic examination showed that the intima was very greatly thickened, and that the outer coat was also hypertrophied. All the elements of which the vessel-wall was made up were, in places, dissociated. Boé, of Paris,³ reports a case of syphilitic retinitis in which iodide of potash made no impression, but which yielded promptly to mercurial inunctions. The same author²⁴ describes an interesting case of rapidly developed blindness, probably due to a specific lesion, which partially yielded to a long employment of lactate of zinc, the daily dose employed being 0.24 gramme ($3\frac{1}{10}$ grains). During the first three months of the treatment the patient suffered from a marked lassitude of the limbs and pronounced anorexia. Both the personal and the family history indicated a neuropathic taint. Panas is inclined to ascribe the blindness to an abortive form of tabes. In a case of optic neuritis of syphilitic origin, Vignes¹⁷³ has tried subconjunctival injections without success; although in old-standing parenchymatous keratitis the injections seem to exert a salutary influence. He believes that many cases of disease of the optic nerve recover under the expectant mode of treatment.

Chacon, of Mexico,¹⁷⁹ divides the ocular manifestations of *leprosy* into the tropho-neurotic form, the anæsthetic or systematized nervous form, and the mixed tubercular, macular, and anæsthetic form; citing several instances of each variety.

Two cases of double soft cataract and one of atrophy of the optic-nerve head following *pernicious malaria* in adolescents are reported by Bagot.¹⁷¹ Risley, of Philadelphia,⁸⁰ records a case of multiple retinal haemorrhages, recurring periodically, doubtless due to malarial poisoning. In discussing the clinical significance of photophobia, Dabney, of Louisville,¹⁰⁵⁴ mentions an instance in which this symptom occurred as a prodrome of typhoid fever.

Hirschberg, of Berlin,¹⁹⁰ cites a case of monocular amaurosis in a man who, three weeks previously, had had an attack of *haematemesis*. Diminution of vision was first noticed eight days after the haemorrhage. Ophthalmoscopic examination showed the optic-nerve head to be pale-yellow and ill-defined. The arteries were full, but contracted, and there was a small retinal haemorrhage near the disc. Vision became normal. Alexander²¹, cites an instance of haemorrhagic retinitis in a patient having *progressive pernicious anaemia*.

An example of a pigmented cataract, in a patient with *diabetes mellitus* of long standing, is cited by Perles, of Berlin.¹⁹⁰ Immediately beneath the posterior capsule of the lenses were deposits of brown pigments, having the appearance of close mycelium threads, and in their meshes were fine dark-brown pigment particles. This deposit caused a peculiar greenish-brown pupillary reflex.

Garnier, of Odessa,¹⁹⁰ discusses the relations of the *endarteritic changes* of the ocular vessels to diseases of the eye. He has seen a "nodule-forming" endarteritis at the point of bifurcation of the central artery of the retina, lying in the bottom of a glaucomatous excavation. One would expect to see such a nodule on the ciliary arteries where they pass through the sclerotic, and again on the cortical veins. The diffuse form develops itself as the result of disturbance of the general nutrition, and occurs in the eye as a part of angio-sclerosis. He believes, also, that this variety arises from local causes. He considers that non-traumatic glaucoma is due to a localization in the eye of a general disease of the vascular system, usually called arterio-sclerosis, but which he thinks should be called angio-sclerosis, in that the intima of the veins is involved, and that the function of exosmosis is increased in the capillary walls of these vessels. When the disease is localized in the ocular vessels, this latter fact soon causes an increased intra-ocular tension, and the primary endarteritis is quickly followed by a secondary diffused arterio-sclerosis. Otto⁴¹ has studied the relation of arterio-sclerosis, particularly of the ophthalmic artery, to structural changes in the optic nerve. In eleven cases occurring in men between 44 and 79 years of age, who had been affected with senile dementia, paralysis, and pseudobulbar paralysis, he found the ophthalmic artery sclerosed and dilated. In simple sclerosis the

nerve was flattened; while in sclerosis with dilatation the nerve was indented. In slight cases single fibres were found to be atrophied; in others whole bundles of them were in the same condition.

Gunn, of London, ²², believes that the existence of a bright central reflection, not broader than usual, upon the retinal arteries, which present a waxy, translucent appearance, may be considered



FIG. 1.—MIXED FORM OF ALBUMINURIC AND DIABETIC RETINITIS.
(Centralblatt für Augenheilkunde.)

indicative of renal disease. A further sign is obliteration of the veins where they are crossed by even small arterial branches, and their occasional disappearance for a short distance on the distal side.

Dahrenstädt, of Berlin, ¹⁹⁰, reports a case of *mixed albuminuric and diabetic retinitis*. The fundi of the left and right eyes are depicted by Figs. 1 and 2, and exhibit the difference between the two forms of retinitis already pointed out by Hirsch-

berg. In the figures the lesions marked *a* are due to albuminuric inflammation, while the small white dots and the remains of the capillary haemorrhages indicate the diabetic changes. Roberts, of England,¹⁶² reports a case of haemorrhages into the vitreous in a woman, 26 years of age, suffering from albuminuria.

A case of cyanopia, occurring in a man 57 years old, afflicted with *pulmonary tuberculosis and nephritis*, is cited by Hilbert.¹⁶³

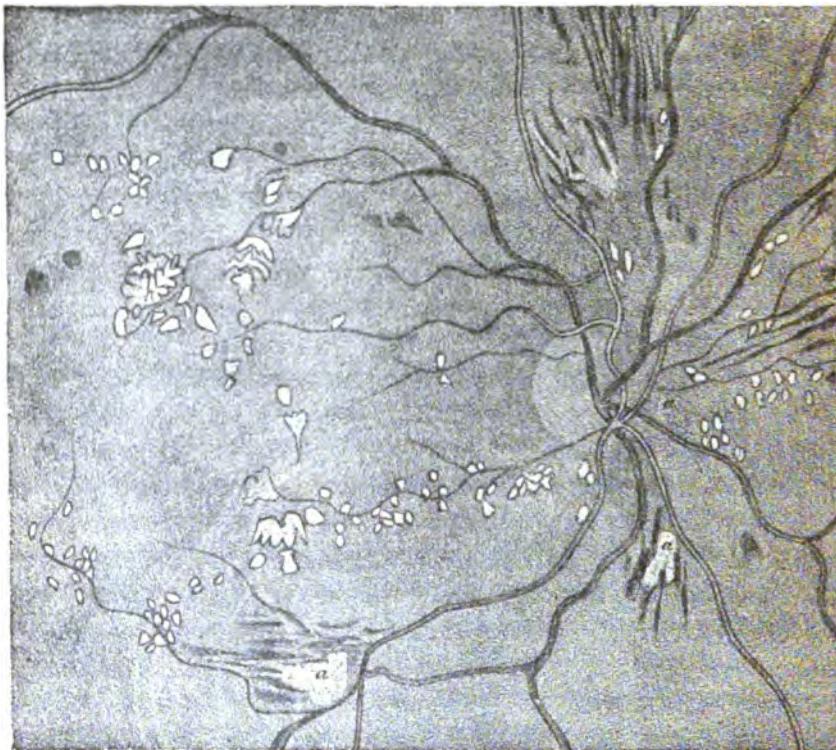


FIG. 2.—MIXED FORM OF ALBUMINURIC AND DIABETIC RETINITIS.
(Centralblatt für Augenheilkunde.)

The attack of cyanopia came on suddenly and lasted nineteen days, disappearing with the improvement in the patient's general condition. The ophthalmoscope revealed signs of albuminuric retinitis. The author considers every form of chromatopsia to be of the nature of a color hallucination. In an article on ocular tuberculosis, Sauvinaeu¹⁶⁴ retains the old division into the diffuse, where the entire choroid is infiltrated, and into the local forms; the latter occurring in the anterior segment of the eye. The disease is

usually secondary to a tubercular disturbance of the meninges, or of some other associated part, and it may be a manifestation of miliary tuberculosis. Rarely it is primary, when it is quite susceptible to treatment. Where the whole uveal tract is involved, enucleation is indicated.

Altabas, of Barcelona,⁹⁶ has seen a case of apparent temporary ocular tuberculosis in a girl 17 years old. There were no symptoms of irritation. Examination revealed a few white points on the posterior surface of the cornea, whilst the iris contained several small tumors of a yellowish-white color, which were clustered together like a bunch of grapes. These growths were not vascular, and were unpigmented. An adequate view of the fundus was prevented by filamentous exudations into the anterior portions of the vitreous. Under a brisk tonic and mercurial treatment the general symptoms of the patient improved, but the local condition remained unchanged. Müller⁵⁷ reports a case of tuberculosis of the iris. He thinks that the predominance of this disease on the right side is due in a great measure to infectious material being more often conveyed by the right hand. Van Duyse, of Ghent,²⁷⁴ holds that tuberculosis of the iris is secondary to a diseased focus elsewhere, that it may undergo spontaneous cure, on which account enucleation is not a justifiable procedure. The operation is resorted to only when the process becomes active and threatens perforation of the globe. The treatment of these cases of "attenuated tuberculosis," as the author, in common with Liebrecht, prefers to term them, consists in the instillation of atropine and of cocaine, the use of mercurial inunctions, hot compresses, iodide of potash, codliver-oil, and other tonics, in conjunction with nutritious food.

An instance of tuberculosis of the iris and suspensory ligament with a tubercular deposit in the retina, occurring in a 9-year-old boy, has been seen by Knaggs, of Leeds.² Enucleation was followed seven weeks later by tubercular meningitis and death. Morton, of Bristol, Eng.,² describes a group of cases of tubercles in the choroid. The points of interest in the first case, as shown by the ophthalmoscope, were (1) a large ring of dark pigment around the growth; (2) a paper-white centre; (3) the large size of the tubercle (slightly larger than the disc). Owing to its infiltration by the growths, the retina was found to be adherent to the tubercles

on post-mortem examination. In the second case, the tubercles were unusually large and were pigmented. In the fourth case, besides the existence of true tubercles, there were patches of absorbed choroid with pigmentary disturbances, which the author believes to have resulted from absorption of the tubercular masses. In a case of tuberculous tumor of the choroid, seen by Hill Griffith,²² the growth formed a prominence about the size of a "filbert" on the outer side of the globe, and was covered by thinned sclerotic. The remaining portion of the eye was filled with stratified blood-clots. There was total detachment of the retina. The microscope revealed numerous caseating centres with giant-cells and reticulum.

As the result of a series of experiments, Hewitt, of London,²³ has been led to believe that visual disturbance has a great degree of importance in the etiology of *seasickness*.

Beer,²⁴ reports a case of a disease of the optic nerve occurring in a female, aged 22 years, who had an *infantile uterus*. The left eye was highly amblyopic, and its field was moderately contracted. There was a total central scotoma for white and colors, while it appeared that stimulation of the optic nerve gave rise to painful sensations. After the lapse of forty-eight days, vision, the field became normal, and the color-blindness, which had been present before, disappeared. At first the author had made the diagnosis of acute retrobulbar neuritis, but thought afterward that the condition might have been caused by a haemorrhage into the nerves; but he could not decide on the relationship existing between the ocular and uterine conditions.

In a case of "*zoster ophthalmicus*" observed by Buller, of Montreal,²⁵ the corneal lesion preceded the skin eruption, which appeared along the course of the musculo-cutaneous nerves, by about six weeks. A case was seen by Chase MacLachlan, of Ann Arbor,²⁶ in a man 58 years of age. There was marked ptosis, inflammation of the cornea and iris, associated with an herpetic eruption on the skin of the forehead and scalp.

Mitchell, of Hornellsville, New York,²⁷ has observed 5 cases of spasmodic mydriasis, 2 occurring in males and 3 in females, all under 40 years of age, each being directly traceable to an irritation or an overexcitation of the sexual apparatus.

Hilbert, of Sensburg,²⁸ has seen pulsation in the principal

branch of the central artery of the retina, during an attack of *flying scotomata*. The patient had had frequent attacks of migraine. The administration of amyl nitrite caused the latter condition to cease, and, with it, the temporary areas of blindness. The author believes that this affection is due either to gross anatomical lesions in the occipital lobe in the region of the coronal coronata or, more probably, to vasomotor disturbances of the light-centre. Antonelli²⁴ divides the amblyopias and amauroses accompanying diseases of the nervous system into transient and permanent forms. Discussing the transitory varieties, he makes the following clinical divisions: 1. Scintillating scotoma. This may or may not present itself in connection with migraine. The scotoma is usually peripheral. The ophthalmoscope sometimes reveals retinal ischæmia, but more often there are no ophthalmoscopic changes. 2. Ophthalmic migraine proper. In this form, the hemicranic syndromes are the most striking features. 3. Hemiopic form and concentric narrowing of the field of vision. 4. Transitory central amblyopia. This is less frequent than the hemiopic variety. The nervous affections, in connection with which these forms of amblyopia have been observed, are neurasthenia, hysteria, epilepsy, tabes dorsalis, and general paralysis. In hysteria, he most commonly met with the amblyopia termed ophthalmic migraine, either in the form of an independent paroxysm or as an aura. He believes that transitory amblyopia, in its generic sense, is very frequent in epileptics, being associated more often with *petit mal* than with *grand mal*.

Writing of the relations of ocular disturbances to general pathological conditions, Verneuil²⁷⁶, May 14, states that functional disturbances of vision are very common in various nervous conditions, and that they often lead to hallucinations. Where hallucinations occur, the right eye is generally affected; and in the few cases in which hallucinations follow affections of the left eye only, the patients are left-handed. From their own experience, together with that of previous observers, Walton and Cheney, of Boston,²⁹ Aug. 15, conclude that "the examination of no case of functional nervous disorder should be considered complete until we have assured ourselves of the ocular condition, whether defective vision is present or not, and have corrected refractive errors, if present, even though small in amount. This step should certainly not be neglected in intractable cases. With regard to specific forms, headache offers

the most fertile field for practical results of treatment. Facial spasm (except when early in its onset), epilepsy, and chorea offer less hope of definite benefit, though indications point to the removal of ocular defects as being the most common cause in the former, and one of the various irritating factors in the latter, which exercises a deleterious effect upon a nervous system already predisposed. In case of mental disorders without organic basis, of general nervous weakness and irritability (neurasthenia), and obscure cases of defective nutrition, it can never be out of place to correct exciting refractive or muscular defects, and results may follow which few would venture to predict." Cheney²², reports four cases of headache which had persisted for years with little, if any, local eye symptoms to suggest their origin. He is convinced that many cases of epilepsy and chorea "can be relieved indefinitely by a correction of refractive or muscular defects." Stillson, of Indianapolis,²³ reports a series of cases of reflex ocular neuroses from damage to contiguous parts. Case 1 was that of a neurotic woman who had had corneal ulcers and headache for three years, both of which disappeared after the removal of a small vascular tumor that surrounded the supra-orbital nerve in its foramen. In Case 2 a supernumerary tooth caused a train of ocular symptoms which was only relieved by its cutting, whilst Cases 3 and 4 were types of another class, where the eye did not seem to have been involved. Dunn, of Richmond, Va.,²⁴ has seen a case of micropsia in an unmarried woman aged 18 years, which he believes was dependent upon temporary reflex ciliary paresis, excited by hypertrophy of the posterior portion of the inferior turbinate bones. A case of isolated reflex mydriasis, which was monocular in type, has been seen by Borthen.²⁵ By a process of exclusion, he concludes that the lesion was located in the nucleus of the sphincter of the iris. In this case the iris failed to contract upon exposure to light.

Seggel²⁶ reports a case of left reflex mydriasis which he believes was due to a central lesion. A year previous the patient had had general oculomotor paralysis of the left eye, which had almost disappeared. There was no direct or consensual action of the left iris to light, but in both eyes the irides responded to convergence and accommodation, while the right eye responded to direct and consensual light-stimuli. The author thinks that if it

be admitted that there is no central connection between the oculomotor nuclei, the case is easily explained by the supposition of a lesion located between the corpora quadrigemina and the oculomotor nucleus of the left side.

A case of total blindness resulting from *brain-tumor* has been seen by Denise, of Omaha.¹⁰⁰ The ophthalmoscope showed a papillitis, acute and progressive in the right eye, but retrogressive in the left eye, with atrophic degeneration. There was a history of albuminuria, and symptoms pointing to the existence of left hemianopsia with double vision some months previously. Post-mortem examination showed a glioma resting upon the commissure, and apparently involving the pituitary gland. A case of hæmorrhagic glioma of the left optic thalamus is reported by Springthorpe,²⁸⁵ in a married woman aged 26 years. A progressive paresis of the right arm and leg, with headache and vomiting, followed a convulsive seizure. Both optic nerves were grayish white, and there was no light-perception. Slight left internal squint with enlarged pupil on the same side, alternating during simultaneous fixation, with equality of the pupils, supervened. At times, the right pupil became the larger. Later, left ptosis appeared. During a period of quiescence following a series of convulsions, the patient died. Post-mortem examination showed, on the inside of the ascending parietal convolution, an irregular four-sided area of erosion, which was blood-stained and excavated, the surrounding area being hard and somewhat discolored. The tumor-cavity contained recently extravasated blood and tissue débris.

Beevor and Horsley, of London,² report a case of traumatic *abscess of the brain* in a boy 12 years of age. There was double optic neuritis, and right hemianopsia with contracted fields. Upon trephining, an abscess was found in the upper part of the left angular gyrus and the outer surface of the left occipital lobe. After the operation the patient was found to have word-blindness, and the right field of vision was found to be contracted on the nasal side to 20 degrees and on the temporal side to 5 degrees, while in the left eye the nasal field was reduced to 10 degrees and the temporal to 50 degrees. Later, hernia cerebri developed and the patient died. On the left side the dura mater was found to be adherent to the margin of the Sylvian fissure, as far forward as the ascending parietal convolution. It was also adherent to the

lower third of the supra-marginal gyrus, to the posterior part of the superior and middle temporo-sphenoidal convolutions, to the whole angular gyrus except the upper fourth, and to the anterior part of the outer occipital lobe. Horizontal section showed much softening, extending inward across the hemisphere from the hernia cerebri.

Zinn,²⁴ gives the microscopical results of the study of a brain taken from a man 48 years old, with a doubtful, syphilitic history. Years previous to the final disease he had had an apoplexy which did not leave any apparent permanent symptoms. When first observed there was a slight difference in the size of the pupils, the irides reacted slowly to light, there was difficulty of speech, and there was slight paralysis of the right arm and leg. A diagnosis of progressive paralysis was made. The patient's condition remained unchanged up to the time of his death. A localized atrophy of the left occipital lobe was found, extending over the whole region of the calcarine fissure and that of the first and second occipital gyri; to a slight extent over the lingual lobe, the occipito-temporal gyrus, the hippocampine gyrus, and the cuneus and praecuneus. There was a marked degeneration of the nerve-fibres, the ganglion-cells, and neuroglia in the external geniculate body, in the pulvinar of the thalamus opticus, and in the quadrigeminate body on the left side. The left optic tract showed some degeneration. From these findings the author concludes that in a relatively pure case of disease of the occipital cortex there was demonstrated a degenerative process in the primary optic centres and in the optic tract of the same side, while the same degenerating process was absent in the other parts of the brain, and he believes that the degeneration of these parts was dependent upon that in the cortex of the occipital lobe, and that, consequently, the cortical centre of vision and the primary optic centres must have close nutritive relations.

Boé,²⁵ cites an instance of *superior homonymous hemianopsia*, which appeared rather suddenly, without apparent cause, and which had persisted for six years. In explanation of the case a supposition was made of a physiological anomaly, one occipital lobe supplying the two superior halves and the other the two inferior halves of the retina. Lesion of one occipital lobe would, then, bring about the described condition. A case of bi-temporal

hemianopsia, in a man aged 50 years, has been reported by Priestley Smith, of Birmingham, Eng.². When first seen there was complete blindness of almost the whole of the temporal half of each field, with a sharp line of demarkation passing, apparently, exactly through the fixation point. Four weeks later, examination showed that the blind area was steadily receding above and below, especially in the left eye, but that in both eyes it was still absolute in the central area, and appeared to reach exactly to the fixation point. To the author this absolute bisection appeared to disprove, for this case, the supposed connection of the whole of the macular region with both sides of the brain. Leyden, of Berlin,⁶⁹ describes a case of well-marked homonymous hemianopsia, the pupils reacting only when the left retinal halves were stimulated. Post-mortem examination revealed a spindle-formed area of softening in the right lenticular nucleus, which extended inward to the crus cerebri, involving the optic tract. Nettleship, of London,^{2, 31} has had a case of right homonymous hemianopsia following a severe blow upon the left side and back of the head and across the bridge of the nose, by a chain. Near the fixation point the line of demarkation deviated about 10 degrees toward the blind side. The remaining half of each side was preserved intact. The patient apparently had hallucinations of sight referred to the blind half of the fields. No definite changes existed in the optic nerves. Vossius⁶⁹ reports an example of left homonymous hemianopsia in a man 64 years old. The boundary-line passed two or three degrees from the fixation point toward the side of the defect.

Putnam, of Boston,⁹⁰ cites a case of loss of the right lower quadrant of each field of vision associated with *right hemianæsthesia and hemiplegia*, the face being affected to a relatively considerable degree. The author suggests that if the same lesion causes the hemianæsthesia and the loss of the quadrant, it would seem as if the optic radiations through the brain must be divisible into two parts just as the cuneus is. An instance of binocular blindness, with negative ophthalmoscopic conditions and integrity of pupillary reaction, dependent upon an affection of the occipital lobes, is cited by Sepilli.⁵⁸⁹ Sep. 16 He believes that binocular blindness, appearing rapidly after an attack of apoplexy, as the only symptom, with negative ophthalmoscopic signs and integrity of pupillary action, can be ascribed to a bilateral lesion of the occipital lobes.

When blindness is dependent upon disturbances in the occipital lobes, it is either complete or occurs in the form of a homonymous hemiopia which may be followed later by the same condition of the opposite side.

Page² records the case of a child 3 years of age, with complete loss of sight resulting from a fall upon the head. There was nystagmus and right internal squint and slight weakness of the right arm. The optic discs were normal, and there was no indication of injury in the anterior parts of the cranium, orbits, or brain. The author suggests that the symptoms might have been caused by a fracture of the base in the occipital bone, extending downward from the posterior superior angle of the left parietal bone.

A case of sudden *unilateral amaurosis*, accompanied by intense headaches, where the only demonstrable change was an apparent bloodless condition of the retina and its arteries, was seen by Bagnéris.⁵⁷ Local massage and iodide of potassium caused a disappearance of the amaurosis.

A case of double optic neuritis dependent upon *spinal disease* has been seen by Drake-Brockman², in a young man aged 19 years. There was paresis of the right sixth nerve, with marked loss of power in both upper extremities and partial loss of power in the lower limbs. The patellar reflexes were abolished. A sensation of thoracic constriction was complained of. Death occurred in coma, preceded by general convulsions. No autopsy was made. Galezowski, of Paris,⁴⁶ states that disseminated peripheral scotomata are the earliest signs of locomotor ataxia. These should be carefully looked for in all suspected cases, and, if found, a vigorous antisyphilitic treatment should be at once inaugurated. Armaignac, of Bordeaux,¹⁷⁸ discussing the subject of *ophthalmoplegia*, discards Mauthner's definition of the term and applies the general name of ophthalmoplegia to all ocular paralyses, whatever be the number and variety of the muscles affected. He divides it into the following forms: (a) internal ciliary muscle, dilator of pupil, and sphincter iridis; (b) external (straight and oblique muscles, elevator of eyelid); (c) mixed (internal and external muscles at the same time). The affection may be unilateral, bilateral, partial, or total. He makes these subdivisions of the lesion into (1) nuclear, (2) fascicular, (3) basal, and (4) orbital

ophthalmoplegia. Cortico-peduncular and peripheral or terminal ophthalmoplegia may be added, but too little is known of the subject to make these varieties more than hypothetical entities. Parinaud, of Paris,¹⁷³ insists that the first distinction to be made is between peripheral and central paralysis. In the peripheral forms the associated muscle of the other eye is in a state of spasm; in the central variety it is paralyzed. He also speaks of ophthalmoplegia of central but not of nuclear origin, namely, that due to lesion of the co-ordinating centres. Finally, he believes that there are paralyses of cortical origin, as those occurring in hysteria.

A case of ophthalmoplegia, with *Graves's disease*, in a married woman 47 years of age, is recorded by Maude.⁴⁷ No proptosis or retraction of the lids was present, the patient having had drooping lids for years. After two attacks of gastric crises accompanied by catarrh of the left middle ear, facial paralysis on the same side, affecting the superior division of the nerve, came on, followed two weeks later by "general left ophthalmoparesis" without mydriasis. This condition lasted two weeks and was succeeded by distinct exophthalmos. The author is "inclined to ascribe this to some lesion traveling along the floor of the fourth ventricle close to the middle line, affecting the nucleus of the facial part of the seventh and the sixth nerve first, but leaving untouched the auditory nucleus which lies farther out. Moving outward, it reached the nucleus of the fourth nerve, and, lastly, that of the third nerve."

Parinaud, of Paris,²¹² reports a case of ophthalmoplegia occurring as the result of an apoplectic seizure, in which the movement of elevation of the eyeballs was reduced to 10 degrees, the internal and external lateral movements to 20 degrees and 30 degrees, respectively, whilst the movements of lowering and of converging the eyes were normal. He explains the case by an involvement of the centre for voluntary ocular movements, which he believes to be situated in a vertical zone anterior to the ascending frontal convolution, the areas controlling the lateral and elevation movements being the most inferior. This hypothesis was strengthened by the fact that the case exhibited certain peripheral symptoms which showed an involvement of the cortical areas in that region.

In two brothers, the subjects of an *hereditary ataxia*,

Geigel⁸⁸, has been able to produce *nystagmus*, with the movements more marked toward the right, by turning the patients three times in that direction. Movements in an opposite direction followed when the patients were turned toward the left. The author has seen the same phenomenon in a case of multiple sclerosis, also in one of apoplexy. In a genealogical table, recorded by C. A. Wood, of Chicago,⁷⁹ as bearing upon the heredity of nystagmus, it appears that, of the twenty-three descendants resulting from the marriage of a pronounced blonde female, having perfectly healthy eyes and nervous system, with a decided brunette suffering from congenital nystagmus and myopic nervous system, only two had ocular trouble. Of these, one daughter and one granddaughter were brunettes, and were the subjects of marked congenital nystagmus, while the others were healthy in all respects. Bullard and Wentworth, of Boston,⁸⁰ have observed a peculiar form of nystagmus ("Cheyne-Stokes"), in a *rachitic* boy 2 years of age. The condition was noticed eleven days after an attack of convulsions, during a period of increasing stupor which terminated in coma and death. "The nystagmus was horizontal, and began with rapid movements; the oscillations being progressively longer and more extended up to a certain point, and then diminishing in the same manner; a pause then ensued, which was followed by a repetition of the previous rhythmical movements. This condition was observed carefully for a few moments, and then the movements ceased, but were reported to have recurred more or less constantly throughout the day." There were no marked pupillary symptoms and no Cheyne-Stokes respiration. Bullard concludes that: "1. This nystagmus is analogous to that form of respiration known as Cheyne-Stokes, and is probably produced by analogous causes. 2. The most probable theory in regard to its production is that it is the result of a constant or chronic irritation of the oculomotor centres, occurring at a time when these centres are depressed and so weakened as to be irritable in their response."

J. A. Smith, of Middletown, Eng.,² reports a case of miners' *nystagmus*, where the ocular manifestations came on while the patient was employed at work in a position which required strong rotation of the eyeballs upward and to the left. Marked improvement followed a change of occupation. Romée, of Liége,¹⁷¹ discusses the etiology and pathogenesis of the nystagmus of miners,

and concludes that it is due principally to a deficiency of light, and not to the position assumed by them when at work. The fact that workmen in well-lighted mines, although their attitude is the same as that of the coal-miner, do not present the symptoms of nystagmus, the author considers to be a proof of his theory. An elaborate study of a case of *right monocular diplopia* following traumatism, in a man aged 50 years, which caused violent headache and some paresis of the right side, is made by Duret and Dujardin.²²⁰ No peripheral condition capable of explaining the double vision could be found. After two months the doubling of objects disappeared. The writers conclude that it could not be explained by a left cortical lesion involving Brücke's muscle, as the diplopia did not persist in all directions; therefore, it must have been due to some disorder in the cortical visual area, the nature of which cannot at present be determined. Tilley, of Chicago,²²¹ gives the subsequent history of a case of monocular diplopia already reported by him. [Vide ANNUAL, 1892.] Six months previous to death the patient entirely recovered from the color-blindness and diplopia. The author adds the notes of four other cases. In all excepting one instance, in which there was some choroiditis, the double vision was practically the only symptom complained of. There were no objective manifestations.

De Schweinitz, of Philadelphia,¹⁰¹⁸ gives the notes of a case of *post-diphtheritic paralysis of the external recti muscles* and bilateral cycloplegia with right unilateral mydriasis and left ptosis occurring in a 4½-year-old female.

Pick²²⁴, reports the case of a woman, 24 years old, who was born with a slight *double ptosis* and restriction of the upward motion of the globes; she also had poor vision. When 3 years old, sight became more impaired and the ocular movements more restricted, and headaches, concentrated on the top of the head, made their appearance. Later, the patient had frequent hysterical convulsions, followed at times by delirium. The fingers were contracted and the poor vision gave way to blindness. The left side was almost entirely anaesthetic, whilst the right side was only partially so. By means of magnetism, the author succeeded in transferring the hemianesthesia to the other side; this procedure was followed by a decided bettering of the vision and a lessening of the contractures. In this case the skull appeared abnormally

developed. The author is of the opinion that this was the causative agent in the production of the congenital symptoms. A second case is recorded of a woman, aged 35 years, who was under observation for some time before death, which occurred as the result of pulmonary œdema. When the patient was first seen, vision was diminished and the visual fields were contracted. The former was decidedly bettered by suggestion. Later, movements of the globe were found to be restricted, except to the right, where they appeared normal; movements to the left were also but little impeded. When at rest, the eyes were fixed downward and to the left. There was some cutaneous hyperæsthesia, whilst the acuteness of the special senses was exaggerated. Still later, the irides, which had before reacted well to stimulation, became immobile. The post-mortem examination revealed extensive encephalomalacia of the cerebrum, involving the cortex of the occipital and frontal lobes. The optic thalami and the anterior part of the anterior corpora quadrigemina were also degenerated.

Panas, of Paris, ³¹_{M.R. 10} reports the case of a man who presented a group of symptoms of *hystero-traumatic* origin. The left eye was amblyopic, and hemiplegia existed upon the same side. He calls attention to the necessity of watchfulness in the recognition of the symptoms, and believes that this form of amblyopia is usually monocular, being on the side of the paralysis, the ophthalmoscopic signs being negative. Fischer, of Dortmund, ²⁵⁴_{M.R. 11} reports two cases of traumatic functional neuroses, caused by concussion in a railroad accident, in each of which there was a contraction of the visual field.

A case of astigmatism, due to a permanent *partial contraction of the ciliary muscle*, has been observed by Galezowski, of Paris, ¹⁷_{April} in a young woman suffering from hysteria, with hemianæsthesia and left homonymous hemianopsia. After persisting several years, the astigmatism, together with the other ocular symptoms, disappeared at the same time with the restoration of the general health.

Röder ³⁵³_{M.R. 11} cites a case of *hysteria* in a girl of 17 years, who exhibited hemianæsthesia, diminution of the cutaneous temperature, loss of co-ordination and muscular power, anæsthesia of the mucous membrane, and functional disorders of the special senses. By means of various agents the author was able to transfer the hemianæsthesia from one side to the other, electricity being the

one chiefly used. The ocular complications were bilateral, though those on the side of the hemiplegia were more marked than those on the right side. A double diplopia existed, one with both eyes, as a result of paralysis of the left external rectus, and the other a true monocular diplopia, which was demonstrated by means of colored glasses; in other words, a binocular quadruple vision. The ciliary muscle and the sphincter of the iris of the left eye were paralyzed; vision was much diminished, but could be brought to normal for a time by the aid of plane glasses. The fields were contracted and the patient complained of micropsia. A peculiar condition existed in relation to numbers. With the right eye the patient would call 13, 113, while with the left eye 13 would appear to be 133. The author believes that the cause for monocular diplopia must be sought for in some derangement of the central nervous system. Pflueger, of Berne,⁷⁸ gives details of a case of *acromegaly*, presenting bilateral temporal hemianopsia.

In an examination of the eyes of 67 *epileptics* Chalton⁴⁵⁴ has found 4 instances of convergent strabismus and 2 of nictitating spasm of the lids. In the former cases there was a predominance of the convulsions on the side of the squint. The author saw chromatic asymmetry of the iris in but 1 case, whilst deviation in the position and size of the pupil was common. In regard to the state of refraction, 16 cases were emmetropic, 31 cases hypermetropic, 12 cases myopic, and 8 cases astigmatic. Subnormal color perception was common. At the time of the convulsion the eyes were either widely open or tightly closed; the balls were directed upward and deviated in the same direction as the head; often, however, there was convergence. The pupils were widely dilated and did not react. In the 5 cases in which the author observed the beginning of the attack, mydriasis was present at the moment of the fall. In 2 instances, in which the seizure came on during an ophthalmoscopic examination, the author noted a paling of the optic-nerve head. After the attack there was strabismus, conjugate deviation, nystagmus, and mydriasis. Vision was also lessened to a variable degree and duration. Dyschromatopsia existed in 11 cases. The widening of the capillaries, the tortuosity and varicosity of the veins, and the paleness of the arteries were seen so constantly after an attack that the author would draw attention to the value of this appearance in making a differential diagnosis in

cases of simulation. Nias,⁴⁷ has seen exophthalmos supervene upon an attack of epilepsy in a man 33 years of age.

In an exhaustive study of the toxic amblyopias, C. A. Wood, of Chicago,¹⁰¹⁸ arrived at the following conclusions in reference to the "alcohol-tobacco" variety: 1. Both tobacco and alcohol, alone and combined, may produce toxic amblyopia. 2. It is probable that it is the nicotine in tobacco that produces the toxic effect. If this be true, chewing is more injurious to the sight than smoking, short pipes than long ones, old or unclean ones than new or easily cleaned pipes, mild cigars and cigarettes than strong cigars, and strong tobacco than mild. 3. The form in which alcohol is taken into the system has much to do with the amblyopic effects. The lighter forms of alcoholic beverages, unless indulged in to great excess, do not permanently affect vision. The same quantity of alcohol which, when diluted (as beer or light wine) would be harmless, might be injurious to the eyesight if taken in the concentrated forms of whisky, brandy, or gin. This is especially true when the latter are drunk between meals or when the stomach is empty."

Chacon, of Mexico,¹⁷⁰ finds, that although Mexico is a city where a great deal of tobacco is used, and that tobacco amblyopia should be common, on the contrary, it is rarely seen. In a series of cases of "tobacco amaurosis" reported by Dickinson, of Missouri,⁸² the almost constant association of this affection with the use of alcoholic liquors is observed.

Panas, of Paris,²⁷⁶ reports a case of amblyopia produced in a woman in an advanced stage of pregnancy by a single dose of 10 grammes (2½ drachms) of sulphate of quinine. Within an hour vision and hearing were both lost. At the end of two days' time the latter returned, but the former remained bad, vision never being fully recovered. There was no disturbance of color perception. He believes that this latter symptom differentiates the affection from alcoholic amblyopia and that the prognosis is grave, but that injections of strychnia, the use of the continuous current, hydrotherapy, and massage should be tried. Chaddock, of Traverse City,⁹⁸ says that the visual imagery of alcoholic delirium consists in the transformation of perceptions of objective movement into animate imagery, i.e., it is the result of direct association of ideas.

SECTION VI.

THERAPEUTICS AND INSTRUMENTS.

The practical deduction drawn by Leber, of Heidelberg,² from the recently acquired knowledge of inflammation, is that the inflammatory processes should no longer be considered as injurious in themselves, but rather as the unavoidable consequence of the damage from without, which they aim to remove; and that our therapeutic measures should be directed against the cause of the inflammation and should not combat, but, on the contrary, should aid this vis medicatrix.

In a most interesting series of observations upon the abuse of *mercury* in the treatment of diseases of the eye, Landolt (corresponding editor in Paris) deprecates the use of mercury in affections other than those engendered by syphilis. Sattler, of Leipzig,¹⁰ claims to have cured two patients by *tuberculin* injections. One had a tuberculous ulcer of the tarsal conjunctiva, while the other was affected with a tubercular tumor of the bulbar conjunctiva. In a third case, however, of lupus of the conjunctiva, the injections seemed to have had no healing action. Inoculation of the anterior chambers of two dogs was made with material taken from each of the first two cases. These were followed by a tuberculous process of the iris. Fourteen and twenty days respectively after the first appearance of the iris tuberculosis the dogs died. Post-mortem sections revealed tuberculosis of the liver and of the kidneys. Tuberculous conditions of the iris developed in about thirty days in the dog inoculated from the third case, and, thirteen days after the first manifestation, inoculations with tuberculin were begun. The well-known reaction, local and general, ensued, and, after twenty-one injections during a period of a month and a half, the author claims that the eye was free from irritation, and that there remained but a small, yellow, tubercular node in the iris. This was excised, and the eye of a second dog was inoculated with it. The untouched eye of the first dog was also inoculated with tubercular matter, and a third dog was used as a control experiment. Tuberculosis of the iris quickly developed in the third animal, causing speedy death. In the first dog the disease did not manifest itself until five weeks after inoculation, and, although the local process was very intense, the general condition of the animal remained good. In the second

dog tuberculosis of the iris developed, but the local reaction was not so virulent, whilst the general condition did not suffer. Doe-nitz, of Berlin, ⁶⁹ draws the following conclusions from his experiments with tuberculin, made upon dogs inoculated in the eyes with tubercular material: (1) that tuberculin is a certain curative agent for the experimental eye tuberculosis in dogs; (2) that its curative action first begins to manifest itself where the real tubercles can be seen with the microscope; (3) that its first manifestation is a temporary, but intense, irritation of the eye; (4) that later the irritation ceases; (5) that the eye is saved where there had been no great changes before the treatment,—otherwise the organ atrophied; (6) that the drug must be given in increasing amounts, so that a sufficiently great reaction can be maintained.

Coomes, of Louisville, ⁶⁸⁸ considers sulphate of eserine to be one of the most efficient drugs in the treatment of phlyctenular conjunctivitis. Chisolm, of Baltimore, ²⁴⁷ finds the galvano-cautery very efficacious in the treatment of vernal conjunctivitis and episcleritis.

Fernandez, of Havana, ⁴⁵⁰, reports eight cases of various forms of combined and disassociated corneal and conjunctival inflammation, in which he obtained either marked improvement or cure by the application of an ointment containing $\frac{1}{2}$ to 1 per cent. of *europhen*. The great advantage that this drug has over iodol is, that it does not cause pain. Coomes, of Louisville, ²²⁴, considers a solution of equal parts of *peroxide of hydrogen and water* to be the most effective agent for cleansing the lachrymal passages. As a substitute, he recommends the use of a 20-grain (1.33 gramme) solution of bicarbonate of soda, followed by a 5-grain (0.33 gramme) one of permanganate of potash. In the treatment of blennorrhœa, Jelks, ⁶¹, has used *pyoktanin* with some degree of success. The use of *aristol* in the treatment of non-infecting ulcers of the cornea is highly recommended by Vignes, ²⁴ and by Bach, of Milwaukee. ⁶¹ Vignes ¹⁷⁸ July concludes that (1) the drug has a most favorable disinfecting and cicatrizing action on ulcerations of the cornea; (2) it is non-irritant to the eye and its appendages; (3) it enhances greatly the value of occlusive dressings; (4) the duration of treatment is shorter than by the methods at present used; (5) cicatricial leucoma rarely occurs.

From observations made with *homatropine* and *atropine* upon

young infants, Carpenter, of London, ⁶, finds that the pupil not infrequently remains for a long time undilated, sometimes for hours, and then often does not dilate to its full extent; that physiological symptoms at times follow the administration of the drug, possibly both from absorption by the ocular conjunctiva and from passage of the fluid down the lachrymal duct. Van Fleet, of New York ¹, is of the opinion that atropine is a most valuable agent in the treatment of certain diseased conditions of the eye, but for the determination of errors of refraction it is not only uncertain and often misleading, but absolutely unnecessary.

The reasons given by Mansfield, of Baltimore, ¹⁹, for preferring the discs of homatropine to either watery or oily solutions of the drug are: 1. A definite quantity is placed into the eye, and hence a definite result is obtained. 2. The discs, being dry, are not subject to the same fungoid growths and changes in composition to which the aqueous solution is subjected, and, consequently, can be kept for any length of time. 3. The action of the discs is more rapid by half, in some cases by two-thirds, than the solutions of the drug. From a study of the relative effects of homatropine and of atropine on the accommodation of the asthenopic eye, Baxter, of Bangor, ¹⁰⁰⁷, has been led to place great confidence in the use of the former, associated with cocaine in the form of discs. Webster, of New York, ¹⁰⁰⁷, reports the case of a woman, aged 32 years, in whom several drops of a 1-per-cent. solution of sulphate of atropia, instilled into the eye for refractive purposes, produced constitutional poisoning. Cotter ¹⁰⁰⁷ adds three cases, in all of which the constitutional symptoms were well marked.

Moffatt, of Brooklyn, ⁷⁷⁶, has found *hydrobromate of hyoscine* very valuable for the determination of errors of refraction. He claims that the drug acts more quickly and that it is more transient in its effects than atropine.

Two instances of anomalous action of the sulphate of hyoscyamine are recorded by de Schweinitz, of Philadelphia. ⁸⁰. In both cases the instillation of a solution of the drug, of the strength of $\frac{1}{4}$ grain to 1 fluidrachm (0.016 to 3.84 grammes), occasioned intense boring pain, referred to the posterior portion of the eye. These symptoms were relieved in the first case by the use of eserine and in the second by the continued use of a mydriatic, in order to overcome the spasmotic condition of the ciliary muscle.

Pflueger, of Berne,¹⁷¹ has found *iodine trichloride* (I, Cl_3) (1 to 2000) to be a powerful antiseptic in diseases of the eye. For subconjunctival injections he uses a solution in strength varying from 1-1500 to 1-1000. In *ulcus serpens* the eye is irrigated with a 1-1000 solution. The borders of the ulcer are then touched with cotton dipped into a 1 to 10 solution. In cases complicated by *dacryocystitis* after linear cauterization, iodoform is insufflated into the inner canthus. Two cases of serious intraocular infection, in which *panophthalmitis* was threatened, are cited, which were successfully treated by injections of the drug.

Heisrath⁶⁹ does not believe *corrosive sublimate* is a specific; and asserts that equally good results can be obtained by massage and other antiseptics. He also claims that where von Hippel's treatment does not speedily give improvement, other operative procedures should have preference. Coppez²⁷⁸, records a cure of sympathetic ophthalmia by means of subconjunctival injections of 0.5 cubic centimetre (8 minims) of a 1-per-cent. solution of bichloride of mercury.

By means of the hypodermatic injection of *pilocarpine*, $\frac{1}{2}$ to $\frac{1}{4}$ grain (0.008 to 0.03 gramme), conjoined with the local use of eserine, Burnham, of Toronto,⁸¹ has seen marked improvement in a case of corneal and vitreous haze occurring in a man who presented a strong rheumatic history. De Schweinitz, of Philadelphia,⁸⁰, records a series of cases of vitreous disease, accompanied by haemorrhage or other type of opacity, favorably modified by the administration of small doses of the fluid extract of jaborandi or the nitrate of pilocarpine. He calls attention to the value of weak solutions of eserine as a local measure in the treatment of these affections. Bourgeois, of Reims,⁵⁷ recommends the following powder in the treatment of *zona ophthalmica* :—

R Subnitrate of bismuth,
Powdered starch, $\frac{1}{2}$ 4.0 grammes (62 grains).
Iodol, iodoform, or aristol, 0.5 gramme (7 $\frac{1}{2}$ grains).

The application to be preceded by boracic-acid lotions. In addition, the eye should be protected, pain assuaged by morphia, chloral, or antipyrin, and complications of the cornea and iris combated by proper local measures, especially by the use of atropine. If the neuralgia is very persistent, cauterization, blisters, or even the continuous current may be found useful. As a last resort,

neurotomy, neurectomy, or neuroteny (nerve-stretching) may be indicated.

In a case of amblyopia without fundus changes, accompanied by hemianopsia of the other eye, Boé⁸, has obtained much improvement by the use of 4 drachms (15.55 grammes) of *lactate of zinc*. In this case there was a history of hereditary hysteria. Jocqs⁸⁷⁹ states that oedema, ecchymosis of the lid, blepharospasm, maturation of cataract, and embolism of the arteria centralis retinae are the principal indications for simple massage; phlyctenular conjunctivitis, spring catarrh, etc., for medicated massage; granular conjunctivitis and leucoma, for medicated and traumatic massage. The plan adopted by Wilson, Detroit,⁷⁷⁶ for securing rational antisepsis in eye surgery is as follows: "1. The skin and surrounding parts are well cleansed with soap and water. 2. The eye is thoroughly irrigated with normal salt solution. 3. The instruments are immersed in boiling water for a few seconds, and are then wiped dry with a soft cloth. 4. The operation is made as rapidly and accurately as possible. 5. The wound is irrigated with the salt solution. 6. The wound is dressed with sterilized dressings, preferably those that have been sterilized by heat. 7. If possible, the dressings are not disturbed until primary union has taken place. 8. The patient's general health should receive the utmost attention, both previous to and after the operation, if this is one of much magnitude." Marbourg, of Pueblo,¹⁰¹⁸ obtains firm and constant adhesion of *Buller's shield* by the application of a thin strip of absorbent cotton moistened with collodion to the plaster, which is attached in the usual way.

Charnley, of Birmingham,⁸² has modified the *globes suggested by Mules* by fixing upon them a plate of enamel of the width and thickness of the cornea, this anterior surface having a representation of the iris and pupil painted upon it. Ostwalt, of Paris,⁷⁸ describes a new *pupillostatometer*, which depends upon the following principles: In the sketch, on page 150, the letters A' and A represent two plane mirrors, the one (A') being fixed, whilst the other (A) is placed upon a slide (D). The apparatus is so arranged that the eye can only see its pupil when the line of vision is perpendicular to the plane of the mirror. If then the two eyes are opposite an immovable plane mirror, and the right and left eyes look successively into it, the distance of the two

points of the plane mirror which reflect the pupils respectively corresponds to the distance of the centres of rotation of the two eyes, or to the pupillary distance for far vision. About four millimetres are subtracted in order to obtain the distance for near vision. To avoid the annoyances usually dependent upon careful testing of the ocular muscles, and, at the same time, to meet the requirements for a rapid and careful determination of any existing anomaly, Risley, of Philadelphia,¹⁹ has devised an apparatus the features of which are well shown in the cut on page 151.

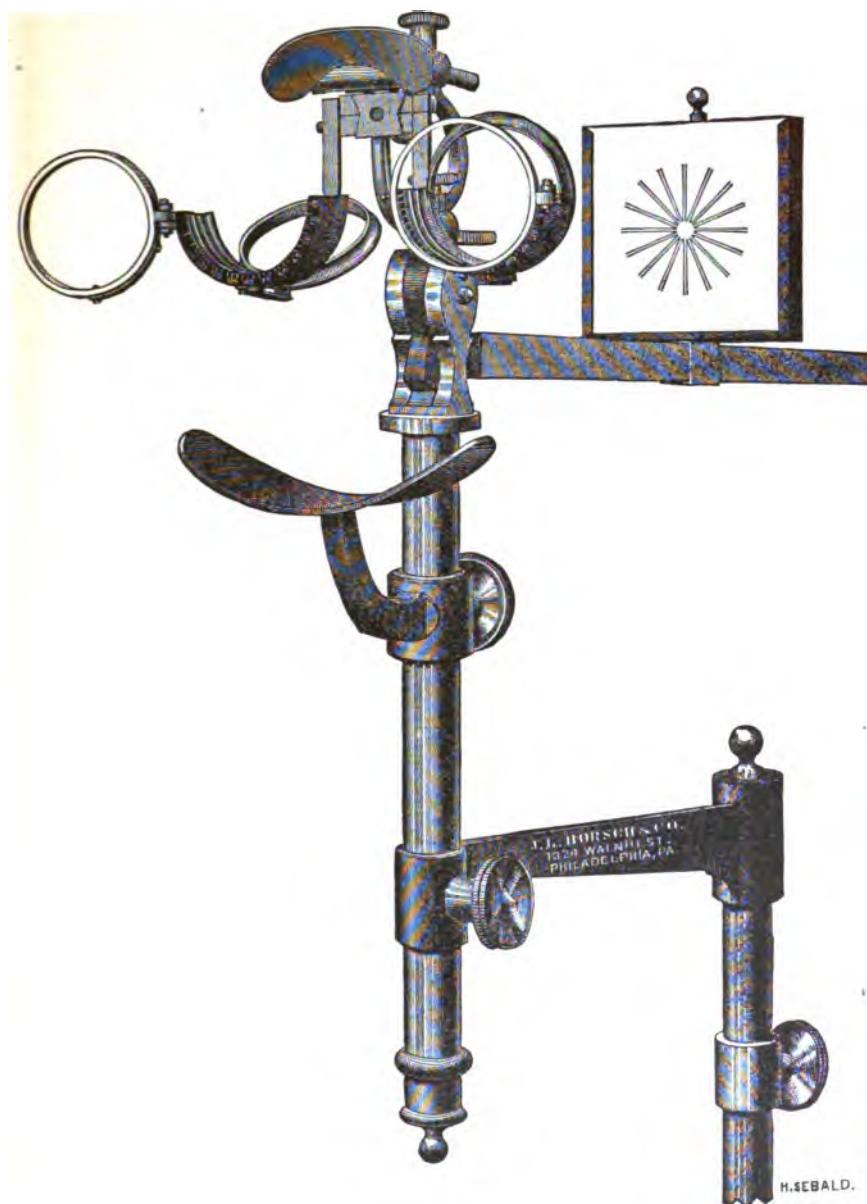
Piton, of Brest,¹⁷⁸ presents a new *perimeter* of very simple construction, designed to ascertain rapidly the degree of the angle at which objects are seen in the examination of the field of vision.



A NEW PUPILLOSTATOMETER.
(*Revue générale d'Ophthalmologie.*)

The sketch on page 152 represents an *astigmatic test chart* which has been devised by Fox, of Philadelphia.¹⁰⁰⁷ The shaded circle at the end of the radii is colored red in the original, this being done to concentrate attention on the inner circle.

In an "*astigmadict*" devised by Boyle,⁷⁷⁶ the disc containing the parallel lines is made to revolve by clock-work controlled by electricity, so that by means of a key-board the chart may be made to start, stop, or revolve, either to the right or left, by touching the button so marked. Galezowski¹⁷³ claims to obtain an erect ophthalmoscopic image, magnified fifty or sixty diameters by the use of *three achromatic convex lenses*. Each lens, which is constructed of three discs of crown glass and two discs of flint glass alternately superimposed, is placed at its focal distance. By this

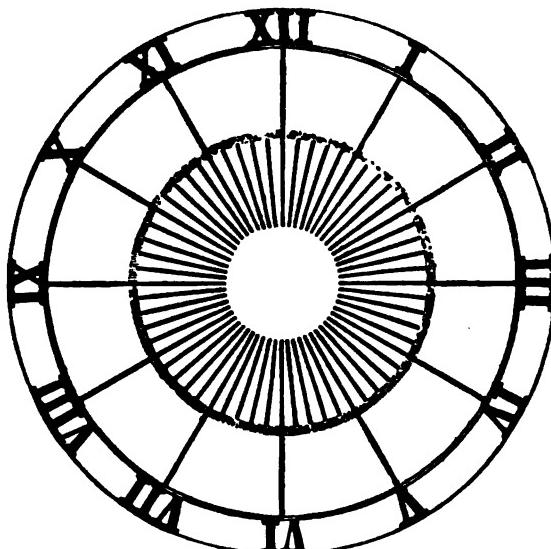


**APPARATUS FOR TESTING THE EXTERNAL MUSCLES.
(*Medical and Surgical Reporter.*)**

means he was enabled to view with precision changes in the retinal circulation and in the arterial coats, such as arteritis and endarteritis, which escape observation by the ordinary methods.

Chevallereau, of Paris,¹⁵² presents a *refraction ophthalmoscope* having a plane and a concave mirror, and also a mirror of short concave focus, inclined at 30 degrees for direct examination. This device permits of ready adjustment without displacing the instrument. To protect the eyes of bicyclists, Couétoux, of Nantes,¹⁷¹ recommends spectacles made of a plain, fine metallic trellis, with sides so arranged as to fit the circumference of the orbit.

Belt, of Washington,³⁶⁷ brings forward the well-known *reversible frames*, having the shoulders of the temples filed off so

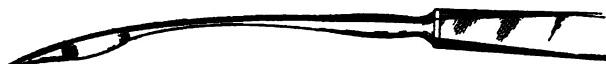


A NEW ASTIGMATIC TEST CHART.
(Ophthalmic Record.)

that they may be reversed and the spectacle turned around. Steward, of London,⁶ has devised a *shot-proof spectacle*, the lenses of which are made from stout pebble or Brazilian quartz, finished in the form of a well-domed oval so as to fully protect the eyes in front and at the sides.

Guermonprez²²⁰ has introduced a pair of spectacles for the protection of workmen's eyes against injury from foreign bodies. The lenses are surrounded by a metallic mounting which permits of ventilation from all sides, and of the ready cleansing of the glass.

The accompanying cut represents a "*stricturotome*" devised by Thomas, of Philadelphia,⁷⁶ for the radical cure of stricture of the lachrymal duct. In operating, the author slits the canaliculus, and then, after locating the stricture with a probe, passes the cone of the instrument through and beyond the contraction, and divides the stricture in at least three different directions, after which the knife is moved laterally in all directions. Before its withdrawal it is carried within the nasal fossa to explore for other strictures. He is in the habit of introducing a large leaden style, eight to ten millimetres in circumference, which is removed permanently at the end



STRICTUROTOME.
(*Ophthalmic Review.*)

of a few weeks. From a large experience with this plan of treatment the author feels warranted in stating his belief that "probing as a method of treatment should be discarded, and that stricturotomy, based as it is upon sound surgical principles, and supported by experience, should be substituted for it, and all other instrumental procedures now in use, in the treatment of stenosis of the lachrymal duct."

In order to overcome the necessity of tilting the blades backward into the pupillary space, E. Smith, of Detroit,⁶¹ has modi-

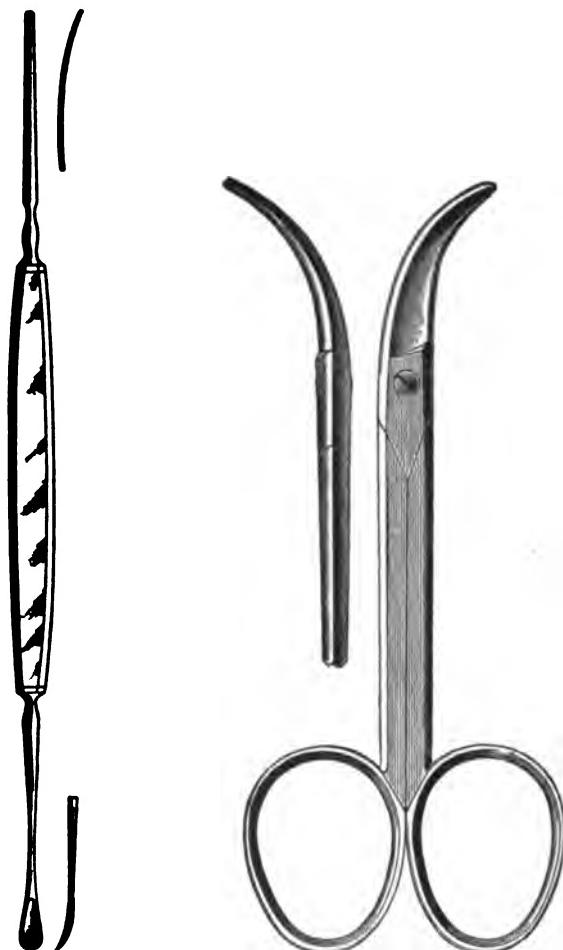


CYSTITOME FORCEPS.
(*Journal of the American Medical Association.*)

fied Knapp's form of de Wecker's cystitome forceps, as shown in the cut, by curving or dropping downward that portion of the blade which contains the teeth below the plane of the blades. A further modification is the sharpening of only the points of the teeth so that they may sink and tear, but avoid cutting the membrane.

The cut on page 154 represents an instrument used in Landolt's clinic for clearing the eye of recalcitrant shreds of cortex after extraction of cataract. On one end of the instrument, as

designed by Hart,² is a curette, fine and small enough to penetrate under the iris even where iridectomy has not been performed. On the other end is a simple flat spoon. The same author describes a pair of scissors for enucleation. As seen in the cut, the



NEW CYSTITOME AND ENUCLERATION SCISSORS.
(*British Medical Journal.*)

blades are curved in the direction of their cutting edge, and also on the flat, thus adapting the scissors at once to the corneal curve and to the globe.

DISEASES OF THE EAR.

By CHARLES S. TURNBULL, M.D., PH.D.,
AND
ARTHUR AMES BLISS, A.M., M.D.,
PHILADELPHIA.

EXTERNAL EAR.

Epithelioma of the Auricle.—J. S. Spaulding, of Portland, Me.,⁸⁶ in concluding a report of three cases of this affection, recommends the removal of the least possible amount of cartilaginous tissue. The sharp spoon is used in operating, unless the extent of infiltration requires the knife. The advantage of covering the wound with skin-grafts is suggested. Straps for the margin of the wound are preferable to sutures, but, if required, the sutures should be extremely fine and close together. Epithelioma, in the writer's experience, appears to be more frequently found among men than among women.

Milligan, of Manchester, Eng.,⁸⁰ reports two cases of epitheliomatous growths, in which the auricle and external auditory canal were extensively involved. Case I: J. D., aged 57 years; family history reveals two cases of malignant disease among the patient's immediate relatives; the patient had always been robust until four and a half years before presenting himself for treatment. Following an incised wound in the auricle, a malignant growth developed in the cicatrix, causing destruction of the upper third and induration of the remaining portion of the auricle. The diseased tissue was removed entirely and proved to be an epithelioma. There has been no recurrence during the eighteen months since the operation. Case II: T. C., male, aged 56 years. Twelve months ago he began to experience a feeling of fullness in the left ear, with twinges of pain. Upon consulting a physician he was told that a polypus existed in this ear, and an attempt was made to remove it, resulting in much haemorrhage. The parts were then cauterized freely. One year later the auditory canal was found to

be filled with unhealthy granulations, while an extensive area of diseased bone was found on the posterior wall of the external canal, and the neighboring lymphatic glands were indurated. No attempt was made to remove this diseased tissue, except the destruction of the granulations by galvano-cautery applications. A post-auricular abscess was also opened. The patient died, eventually, from exhaustion. The only exciting cause for this condition of the auditory canal was an injury to the ear, which occurred some two months before the patient began to experience his first subjective symptoms.

A. Marmaduke Shield, of London,⁶⁶ removed a *sarcomatous growth from the external auditory canal* of a patient who had suffered, since childhood, from otorrhœa and several attacks of purulent inflammation of the mastoid process. This growth occurred in the left auditory canal. It was a large, sessile, gelatinous-looking tumor, about the size of a large cherry. The removal was effected by means of cold snares and forceps, the remaining fragments being destroyed with chromic acid. The growth recurred within one month after the operation. A section from this growth

FROM A SARCOMATOUS GROWTH IN
EXTERNAL AUDITORY CANAL.
(Archives of Otology.)

showed it to be a sarcoma. The second mass, more vascular than its predecessor, was then removed with snares, and the remaining portions curetted away by means of a specially-devised instrument. The bone, being thus exposed, presented a sinus leading into the mastoid cells. The opening of this sinus was burned thoroughly with an electro-cautery point. Peroxide of hydrogen was afterward used, as a wash. This substance passed from the mastoid cells down into the naso-pharynx, by way of the tympanum and the Eustachian tube (?) The patient recovered, and the growth has not recurred during the six months following the operation.

Würdemann, of Milwaukee,⁶⁶ reports finding a *case of condylomata of the external auditory canal*. The growth occupied one-fourth the calibre of the right auditory canal, extending from

the meatus to the remnants of the drum-head. There was double otorrhœa and destruction of both drum-heads. The lesion did not yield to ordinary treatment, but disappeared after the patient had undergone hypodermatic medication with corrosive sublimate, and iodides internally.

Nathan S. Robert, of New York,¹⁸⁸ calls attention to *a case of double chondromalakosis*. The lesion first appeared in the left ear. The antihelix became the seat of swelling, which developed over the entire auricle. Upon incising the swollen tissue, some fluid, resembling synovial fluid, escaped. Treatment consisted in incision, once repeated, iodoform to the cavity, and pressure by bandages. Subsequently, the right ear became affected with a similar lesion.

Exostoses of the External Auditory Canal.—Barclay, of New York,³⁶⁴ has operated successfully upon two cases of aural exostoses, in both of which the bone was removed by "bits" and "drills," driven by means of the Bonwill dental engine. Hæmorrhage is usually profuse, and it is practically impossible to check it. Little danger, however, results from the field of operation being thus obscured, as the instrument is so delicate that the extent and direction of cutting can be appreciated by the sense of touch.

St. John Roosa, of New York,³⁶⁵ mentions the removal of an exostosis from the posterior wall of an auditory canal,—junction of the bony and cartilaginous parts. The instrument used was the chisel. The growth proved to be a thin plate of bone.

A case of multiple exostoses of the head, with unilateral atrophy of the face, is reported by Krakan, of Berlin.³⁷¹ The patient, a girl 12 years of age, presented four bony masses on the face, one of which completely closed the auditory meatus. This growth appeared to be attached to the superior wall of the auditory canal. To accomplish its removal, the auricle was separated from the side of the head by an incision along its posterior insertion; it was then drawn forward, and the bony part of the canal exposed. Two other bony growths were then found in this canal, the three growths being all attached to the antero-superior wall by broad bases. They were removed by means of chisels, and the auricle was then replaced in position, with a drainage-tube in the auditory canal. The parts healed promptly, and there has been no recurrence of the exostoses. Hearing is only slightly dimin-

ished. The case is an obscure one. The child was scrofulous from birth, thus leading one to suspect the possibility of hereditary syphilis, which Toynbee considers the cause of such bony growths. Krakan believes that the aural exostoses and the otorrhœa, which also existed, were dependent upon the same conditions—some trophic derangement—which produced the bony growths in other parts of this patient's head.

Lavrand, of Lille,⁸ in an article upon *cysts of the auricle*, lays stress upon the importance of distinguishing between an ordinary cystic tumor and othæmatoma; that such tumors produce deformity is, most frequently, on account of the heroic measures resorted to for their removal. Two cases of sebaceous cysts and two of colloid cysts are referred to by Lavrand, in which complete removal was accomplished without deformity. The tumors were punctured with a galvano-cautery point consisting of a very fine platinum wire, producing a small opening and yet capable of reaching every part of the interior walls of the cyst. These walls were cauterized by light applications of the point, so as to cause inflammatory adhesion. Two or three applications sufficed to effect the cure.

Fracture of the Anterior Walls of the Auditory Canals, and Luxation Backward of the Inferior Maxilla, the Condyles of which Penetrated into the Ears.—Such was the character of an accident reported at the meeting of the Société d'Anatomie et de Physiologie, at Bordeaux.¹⁸ The accident happened to a coal-heaver, 36 years of age. Owing to a fall upon his chin, striking this part slightly to the left of the median line, the patient's inferior maxilla was forced backward, causing fracture of the anterior walls of both auditory canals, profound deafness, intense pain in the ears, and otorrhœa. At the time of examination, the anterior walls were almost in contact with the posterior. Hearing has gradually improved since the accident.

A New Operation for Reforming the Auditory Meatus.—H. Gifford, of Omaha,¹⁹ resorted to a new procedure for overcoming the cicatricial closure of the meatus in the case of lupus. The meatus was so occluded as to prevent the escape of pus, which came from the middle ear. Under chloroform, the occluding tissue was cut out, together with a large tuberculous nodule, which infiltrated the soft parts anterior to the meatus. After scraping the canal with sharp

spoons, and cleansing with hydrogen peroxide, the wound was plastered thoroughly with Thiersch flaps, taken from the forearm. Aristol was then filled in around a small glass tube, which reached almost to the middle ear. A moist dressing was employed, left in place for two days, then changed daily for one week. The flaps "healed in" perfectly, and the result was a complete success. Unfortunately, the primary disease advanced, and led eventually to the destruction of the new-formed meatus. The author advises that, in resorting to this operation, the pinna, if normal, should be detached partially, in order that the grafts may be adjusted accurately.

Furunculosis.—Maggiora and Gradenigo, of Italy,⁷³⁹ July, Aug., '91; ⁸⁷ Dec., '91 as a result of bacteriological investigation of furuncles of the auditory canal, conclude that this condition is associated frequently with general furunculosis; that, in the majority of cases, the staphylococcus pyogenes aureus is the offending micro-organism; next in frequency, the albus and citreus. In one case, where the albus was present, the bacillus pyocyaneus was also observed, this being the first instance recorded in which the latter micro-organism has been found in furunculosis of the auditory canal.

Referring to *treatment of furunculosis*, Cholewa, of Berlin,¹⁰⁰ still claims good results from solutions of menthol in oil. He has reduced his menthol solution to a strength of 10 per cent., and applies it on cotton pledges. He fancies that it is of service in the treatment of boils, and for the external otitis so often attending otorrhœa. In cases presenting this latter condition, the ear is to be cleansed with some antiseptic wash, after which the menthol solution is dropped into the tympanic cavity, and the auditory canal is closed with a pledge of cotton moistened in menthol-glycerin.

MEMBRANA TYMPANI.

Traumatic Perforation of the Drum-Head.—As a result of examinations of forty-two cases of drum-head perforations, J. J. Nothers, of Düsseldorf,³⁴⁴ makes the following generalizations: There were few cases exhibiting severe subjective symptoms. In only seven patients was nausea, vertigo, falling, or unconsciousness observed. Where any involvement of the labyrinth was indicated, it appeared to result from retraction of the ossicular chain, concussion of the labyrinth and of the brain, or haemorrhage.

In the cases examined, perforation was caused by unskillful extraction of a foreign body, 1 case; manipulations in the ear with hair-pins, ear-spoons, needles, matches, paper, 7 cases,—making 8 cases of "direct rupture"; blows on the ear, 19 cases; vibrations from discharge of guns, 7 cases; fall, 5 cases; Politzerization, 2 cases,—making 33 cases of "indirect rupture."

The direct perforations were located in the posterior half of the drum-head, this portion of the drum-head being, for anatomical reasons, most exposed to contact. The "indirect ruptures" occurred mostly in the anterior half, their production depending upon the resistance of the tissues of the drum-head and the tension of this membrane. The perforation caused by indirect rupture depends, also, in many instances, upon the presence of long-standing pathological changes, affecting either the resisting power or tension of the drum-head; localization of the rupture is also regulated by such conditions. Twenty-one cases, in the author's series, exhibited ruptures associated with these old lesions. In thirteen cases, the rupture was located in the anterior half of the drum-head. Inflammatory processes are more frequently associated with direct, rather than indirect, ruptures, as the former are apt to cause more general laceration of surrounding parts, as well as the introduction of micro-organisms. Injury to hearing varied greatly in the different cases. In all cases, there was defect in the perception of the lower notes of the scale. Weber's test was perceived most clearly in the affected ears. Rinne's test was, in all cases, negative, or greatly lessened, but a fork of higher pitch, a', might be positive, while one of two octaves lower, A, was negative, in results. The symptoms noted are caused by rupture of the circular and radiating fibres of the drum-head, producing a membrane so relaxed that it is drawn inward by the tensor muscle, and fixation of the ossicular chain results.

Regeneration of the Substantia Propria in Cicatricial Membranes.—B. Gomperz, of Vienna,^{385 286} Apr. 1, Sept. Oct. has investigated this subject, in the case of a cicatricial membrane, which had developed in place of a drum-head, which had been totally destroyed, together with the handle of the malleus. The lesion resulted from suppurative inflammation of the middle ear. The new-formed membrane was found to be 0.4 millimetre in thickness, instead of 0.13 millimetre, the normal thickness of the drum-head. Three-fourths

of the thickness was produced by the radiating fibres of the substantia propria, the circular fibres being absent.

This observation disagrees with the opinions of Politzer, Gruber, Schwartze, and Zaufal, according to whom the substantia propria is not regenerated after perforation, except in cases of rupture from traumatism; never after perforation from a suppurative process.

NEW INSTRUMENTS.

A Tragus Retractor—E. Cresswell Baber, of England,⁶⁶ has devised the instrument illustrated in the accompanying cuts, which explain the mode of its use. The instrument is said to be of service in the removal of cerumen, scales, etc., the incision of boils in

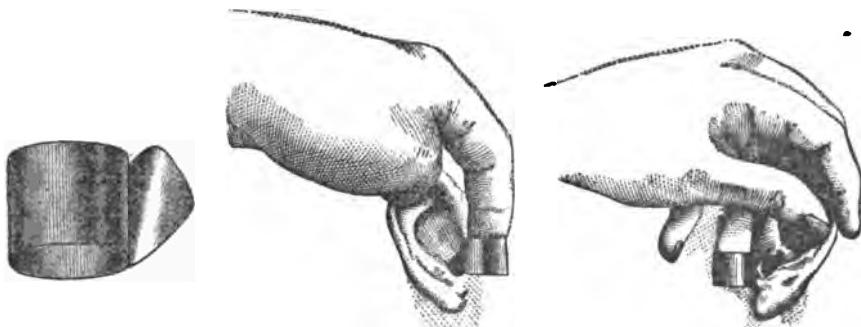


FIG. 1.—TRAGUS RETRACTOR.

FIG. 2.—MODE OF APPLYING TRAGUS RETRACTOR TO RIGHT EAR.

FIG. 3.—MODE OF APPLYING TRAGUS RETRACTOR TO LEFT EAR.

(Archives of Otology.)

the meatus, and the snaring off of large polypi which fill the cartilaginous part of the auditory canal.

A New Aural Speculum and Head-Rest.—Figs. 1 and 2 on page 8 represent a speculum to which a lens and mirror are attached, the lens being convex and having about three and one-half inches focus. The head-rest gives firm support for the patient's head. Light is reflected into the auditory canal by the small mirror attached to the speculum, and the view can be magnified by the lens. Good daylight can be used for illuminating, but, if not available, gas or electric light is employed, the lamps being elevated about one or two feet above the patient's head. The entire apparatus, including five funnels and the case, weighs only four ounces. The instrument is devised by Ward Cousins, of England.²

MIDDLE EAR—OPERATIONS OF EXCISION.

Excision in Non-Suppurative Inflammation.—Scott, of One-hinga,⁶⁶⁷ reports favorable results from an excision operation performed upon a woman, aged 40 to 50 years, deaf and dumb since birth. Such cases are rather unfavorable subjects, and it is a question as to the wisdom of subjecting this still new and most rational procedure to almost certain failure, by applying it to this class of cases.

In Scott's case, tests with the galvanic current and tuning-fork indicated that bone-conduction was perceived, the right ear giving the more favorable response to these tests. An opening in the drum-head of this ear enabled the patient to hear the ticking of a watch held close to, but not in contact with, the auricle, and also the



FIG. 1.

EXAMINATION OF AUDITORY CANAL.
(*British Medical Journal.*)



FIG. 2.

vibrations of C₂ tuning-fork. The drum-head and ossicles were removed, chloroform being used as the anæsthetic. Immediately after the operation the patient could hear the notes of a piano played in the adjoining room, a watch held at two inches from the ear, the barking of a dog; also speech, when addressed to her, and, if loud, when spoken to others. A partially successful attempt was made to teach her articulate sounds. Two weeks after the operation a cicatricial membrane had formed, and the patient was again totally deaf. Attempts were made to destroy this membrane by cautery applications, but there was no return of hearing.

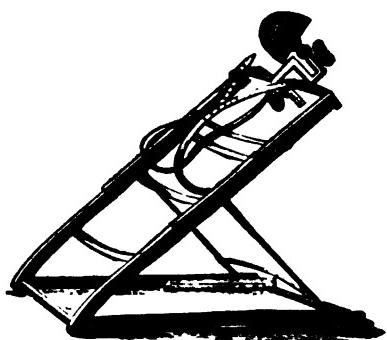
A. A. Bliss, of Philadelphia,¹¹² reports a case of almost total deafness, in which an appreciable degree of improvement followed the excision of the right drum-head and malleus. Preliminary examination of the right ear showed air-conduction to be 15", bone-conduction 20". The voice was perceived only when raised in pitch to a shout. After the excision of a greatly calcified drum-head with the malleus, hearing was raised to eight inches from moderately loud voice. The patient can now use an ordinary ear-trumpet in this ear, thus hearing conversation at normal pitch.

E. Dench, of New York,⁶⁶ strongly favors resort to myringectomy and excision of drum-head and ossicles, after a fair trial and failure of the older methods of mobilization. The writer states that in no case has he ever seen a bad result follow any of these operations, either immediately or subsequently; and, in nearly all cases, there has been a certain amount of improvement, either in diminishing tinnitus or increasing hearing. In treating of the subject of chronic, non-suppurative inflammation of the middle ear, the writer advises that, in testing hearing, Hartmann's series of five tuning-forks, differing by octaves, should be employed. When ankylosis is so great that fork C¹ is heard better by bone- than by air- conduction, it is probable that treatment will fail to overcome the rigidity. Age may confuse the examination regarding prognosis, on account of the condition of functional impairment of the auditory nerve, not uncommon in individuals beyond middle life, and called by Roosa, "presbykousis." This is of far less import than similar signs in younger people. Hearing will be found to fail for the lower-toned forks first; when sclerosis is more advanced, the higher forks will fail. Improvement will reverse this order. Treatment, at first, should consist in the old inflation methods with medicated vapors, bougieing of the Eustachian tubes when stenosed, and proper treatment for the post-nasal space. Such procedures should be continued persistently, unless the patient's hearing becomes worse. It is recommended that the patient should listen to reading through an ear-trumpet, the words not well perceived being repeated frequently. This is an excellent method for massage and training. After failure by these methods, the excision operation is to be resorted to.

Dench, of New York,⁶⁶, has also described his apparatus for supporting the head and shoulders during operations on the ear

and upper air-passages. The apparatus is made of iron, and can be so adjusted as to conform to the size of the patient. Anæsthetics can be administered with the patient in the horizontal position, after which the supporter can be raised to the height required.

Excision of the Stapes.—C. J. Blake, of Boston, ³¹, advocates the removal of the stapes in cases of plastic otitis. He speaks with authority, having performed all the operations which have been advocated during the development of operative surgery for aural disease. These have become more and more progressive, thorough, and rational in their character, until now it is proposed to attack the ankylosis at the one point where it does the most harm,—the foot-plate of the stapes. The justifiability of this procedure is to be premised from the fact that the stapes is especially liable to be tied down by the reduplications found in about 80 per cent. of normal ears. For the improvement of hearing and the relief of tinnitus, in the severe cases of chronic non-suppurative diseases of the middle ear, the disarticulation and removal of the stapes is likely to be of more lasting benefit than removal of the incus, or of



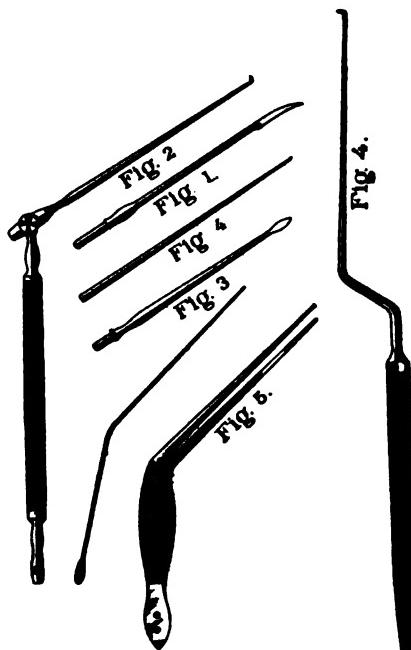
HEAD AND SHOULDER SUPPORT.
(*New York Medical Journal.*)

the incus and malleus. The author would not hesitate to recommend stapedectomy in cases where he had proposed formerly to divide the incudo-stapedial articulation and make division of the tendon of the stapedius muscle. The operation varies in difficulty in individual cases, but is more easily performed in chronic non-suppurative cases than in plastic conditions resulting from old suppurative processes.

The fact that *the stapes can be removed without serious consequences resulting* has been demonstrated by Botey, ³⁷, from his experiments upon the lower animals. From this work he draws the following conclusions: 1. The avulsion of the stapes in animals is an entirely innocuous operation. 2. Whether the oval or round windows are torn or not, and whether or not labyrinthine fluid escapes, a new membrane, much thicker than the old, is

always formed after this operation. 3. In all cases, after removal of the stapes, the animals hear well, but at a shorter distance than before. 4. In animals which have neither membranes or columella, hearing is a little better than in those from whom the drum-head has been removed while the stapes is left in place. 5. This operation would probably be equally innocuous in man, if it were possible to execute it equally well, and under strict antiseptic precautions. 6. The drum-head and ossicles are not indispensable to hearing, but they simply re-inforce the intensity of sound-waves.

The best proof, however, that this operation of "stapedectomy" is quite applicable to the sufferer from plastic otitis is afforded by *the report of sixteen cases of excision of the stapes for middle-ear inflammation*, by Frederick L. Jack, of Boston. Only a small portion of the drum-head is removed, together with the stapes, leaving the malleus and incus *in situ*. It is claimed that not only is the simple removal of the stapes much better in its results, as shown by the operations already performed, but, on the ground of conservative surgery, it is much to be preferred. The author has not had inflammatory reaction in any of his cases. In operating, a flap, shaped like an inverted V, is made in the drum-head just over the incudo-stapedial joint. This flap falls outward, giving a clear view of the incus and its articulation with the stapes. The stapedius muscle must then be separated *completely* from the head of the stapes. The knife used is shown in Fig. 1 of the accompanying illustration. The incudo-stapedial joint is next severed by passing through the joint, from behind forward, a very small triangular knife, bent in the shape of an obtuse angle, Fig. 2; and,



INSTRUMENTS EMPLOYED FOR REMOVING THE STAPES.

(*Transactions of the American Otological Society.*)

if the stapes is not yet perfectly loose, it can be made so by passing a small-pointed knife, Fig. 3, around its head. If the articulations are divided completely, a small hook, Fig. 4, or forceps, Fig. 5, introduced behind the head of the stapes, will, with gentle traction, remove this ossicle. Slowing of the pulse was noticed, in two or three cases, upon touching the stapes. The patient is to remain in bed for two or three days after the operation, keeping the ear plugged with cotton, undisturbed. (We have tabulated the results of Jack's sixteen operations, which certainly make a very favorable showing for this procedure. See next page.)

Excision in Suppurative Inflammation of the Middle Ear.—We quote from another paper by Frederick T. Jack, of Boston,²⁹, reporting three cases of operative treatment for purulent inflammation.

Case I. Woman, aged 42 years; has suffered from purulent discharge from the right ear for forty years; considerable tinnitus, large perforation in right drum-head, necrosis of head of malleus, and adhesion to the promontory. *Operation:* Removal of the malleus, and cleansing of the ear with 1-2000 bichloride wash. *Result:* At end of three months the middle ear is found to be dry and the mucous membrane white in color. Hearing is greatly improved for conversation; $W= \frac{1}{2}$; no tinnitus.

Case II. Girl, aged 14 years; otorrhœa of left side, lasting many years; malleus is carious, and a large polyp is attached to the manubrium. *Operation:* Removal of malleus and polyp by means of the snare, and of granulations in the upper part of the tympanum by the curette. *Result:* Great diminution of discharge. The patient left the hospital while still under treatment.

Case III. Girl, 13 years old; otorrhœa from left ear for ten years; occasional vertigo. There was extensive destruction of drum-head, malleus firmly adherent to the promontory, and a small spot of necrosis existed on the anterior edge of the manubrium. Granulations were found, covering an area of diseased bone, on the inner wall of the middle-ear cavity. *Operation:* Removal of the malleus, made difficult by numerous bands of connective tissue about the head of the bone; the granulations on the inner tympanic wall were curetted. *Result:* Discharge in the ear has ceased; no complaint of vertigo; hearing is the same as before operation.

DISEASES OF THE EAR.

WHISPERED VOICE.		ORDINARY VOICE.		LOUD VOICE.		WATCH.		AER.- CONDUCTION.		BONE- CONDUCTION.		KÖNIG'S RÖSE.		
Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	
Case I.	No record.	No record.	No record.	1 ft.	25 ft.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	
Case II.	No record.	No record.	No record.	10 ft.	18 ft.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	
Case III.	18 in.	8 ft.	20 ft.	20 ft.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	
Case IV.	8 ft.	No record.	No record.	20 ft.	15 ft.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	
Case V.	0	2 ft.	9 ft.	No record.	20 ft.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	No record.	
Case VI.	0	1 ft.	0	15 ft.	20 ft. +	a. s. $\frac{1}{10}$	a. s. $\frac{1}{10}$	0''	2''	In better hearing ear.	In better hearing ear.	No record.	No record.	
Case VII.	No record.	4 ft.	9 ft.	30 ft. +	No record.	a. d. $\frac{1}{10}$	a. d. $\frac{1}{10}$	No record.	No record.	No record.	No record.	35,000	40,000	
Case VIII.	4 ft.	15 ft.	20 ft.	25 ft. +	No record.	a. d. $\frac{1}{10}$	a. d. $\frac{1}{10}$	No record.	No record.	No record.	No record.	35,000	30,000	
Case IX.	0	1 ft.	2 ft.	25 ft. +	No record.	a. s. $\frac{1}{10}$	a. s. $\frac{1}{10}$	No record.	No record.	No record.	No record.	30,000	30,000	
Case X.	2 ft.	8 ft.	6 ft.	9 ft.	No record.	25 ft. +	a. s. $\frac{1}{10}$	a. s. $\frac{1}{10}$	No record.	No record.	No record.	80,000	80,000	
Case XI.	0	7 ft.	0	10 ft.	Trace of hearing.	20 ft.	0	a. s. 0	record.	d. +	s. +	0	85,000	
Case XII.	No record.	1 ft.	80 ft.	No record.	4 ft.	No record.	a. s. $\frac{1}{10}$	15''	In left ear.	In left ear.	30,000	30,000	30,000	
Case XIII.	2 ft.	5 ft.	4 ft.	15 ft.	10 ft.	a. s. $\frac{1}{10}$	a. s. $\frac{1}{10}$	No record.	No record.	s. +	s. +	35,000	50,000	
Case XIV.	0	1 ft.	6 in.	7 ft.	5 ft.	20 ft.	a. d. $\frac{1}{10}$	a. d. $\frac{1}{10}$	In right ear.	In right ear.	20,000	40,000	40,000	
Case XV.*	No record.	6 ft.	19 ft.	8 ft.	80 ft.	a. d. $\frac{1}{10}$	a. d. $\frac{1}{10}$	3''	10''	d. +	All like in both.	80,000	85,000	85,000

* Stapes not found; slight improvement in hearing.

Cases for operation are to be divided into two classes: (1) in which there is necrosis of ossicles alone; (2) necrosis of the ossicles and of parts of the tympanic wall. The most-speedy cures, after operative treatment, are found among the members of the first class; in the second class of cases healing is delayed, the slowness of the process depending mainly upon the seat of the diseased bone.

Reinhard reports, to the Otological Section of German Naturalists and Physicians' Congress,¹¹ sixteen cures, out of thirty cases of otorrhœa from ossicular necrosis, in which excision had been performed. In the cases still unhealed there had been extension of the disease to neighboring cavities of the mastoid process or antrum, small cholesteatomatous masses in these parts being often the obstacle to healing. After operations the parts are irrigated with a 2- to 3-per-cent. solution of carbolic acid, and after eight or ten days, if no cicatrization has taken place, carbolic-acid syringing is practiced daily by means of Schwartz's antrum cannula. Healing began, in the sixteen cases, in from ten days to two and a half months. Schwartz's method is preferred to Stacke's, as being less severe, safer, and simpler, and giving rise less frequently to vertigo, facial paralysis, or severe haemorrhage. In the author's thirty cases, none of these complications had occurred. Hearing improved in 50 per cent. of the cases, but the other half of the series gave no signs of improvement. The operation, in the author's estimation, is not intended to bring about improvement of hearing, but is undertaken to preserve health and life.

Stacke, in discussing this paper, did not deny that the previous excision of the necrotic ossicles was of value, but his own method of operation offered less chance for the necessity of performing a second operation, while the removal of the incus through the meatus was not entirely without danger.

Luc, of Paris,¹¹ reports two cases of otorrhœa which were cured by excision of the malleus and thorough curetting of the granulations in the tympanic cavity. In Case I, a man 24 years of age, otorrhœa had existed for seven years. There was perforation of Schrapnell's membrane and caries of the head of the malleus. Immediately after the operation the patient complained of great tinnitus and vertigo; there was, also, vomiting of "biliary" matter. All these symptoms disappeared at the end of two weeks.

Deafness in the side operated upon has increased. Two months after the operation all vertigo had ceased and hearing had improved, although still less than before the operation, it being then two centimetres for watch, now one centimetre. All discharge had ceased and a depressed cicatricial membrane occupied the place of the malleus.

Case II. Woman, 29 years old ; otorrhœa ; ostitis of tympanic walls (tubercular ?) ; polypoid masses filling the external auditory meatus. These latter were removed, bases cauterized with chromic acid, and frequent instillations of boric acid in alcohol ordered. These instillations caused great pain, and, after using them for three days, paralysis of the left facial nerve developed. This disappeared at the end of three weeks. There was persistent recurrence of the polyp, whose origin was behind the malleus, in the postero-superior region of the tympanum. Operation consisted in the removal of the malleus, curetttement of all polypoid masses, and cauterization of bases with a 1-10 solution of zinc chloride. No vertigo was produced, but slight pain and temporary insensibility of the left edge of the tongue. It became necessary, under cocaine, to once again curette the granulations ; but, two months after the operation, there was complete cure. The malleus was not necrosed, but had prevented satisfactory ingress to the diseased areas behind and above it.

Treating of chronic purulent otitis Schmiegelow¹⁶⁹ states that in 5.8 per cent. of his cases perforation of Schrapnell's membrane was found, and in these the ordinary treatment by syringing was quite useless. In a few cases, better results came from syringing through the Eustachian tubes. Cleansing the attic by means of Hartmann's cannula produced healing in 16 cases and improvement in 11 cases out of a total of 54 cases. Negative results were observed in 15 cases. The results were unknown in 12 cases. In 20 cases, where no results had followed conservative treatment, excision of the drum-head, malleus, and incus was performed. The hammer was carious in 14 cases, healthy in 1 case. The incus was removed, carious, alone in 1 case ; with the malleus, in 3 cases. Among the 25 cases of operation healing occurred in 9 patients, improvement was noted in 8 patients, there was no improvement in 2 patients, and in 1 case the result was unknown. As to hearing, it was improved in 10 cases, unchanged in 6, and in 3 it was made worse.

When otorrhœa persists after excision of the necrotic ossicles, the pus comes either from the necrotic walls of the tympanum or antrum, or from the mastoid cells.

William Milligan, of Manchester, England,⁶ has written upon the *treatment of attic suppuration by excision of the membrana tympani and auditory ossicles*. The author has found this form of suppuration (attic) in twelve cases among three hundred and seventy-five aural patients, or 3½ per cent. Although one of the rarer forms of ear disease, he believes that its frequency is underestimated. In twelve cases treated by the author, the condition was secondary to scarlatina in six, to naso-pharyngeal catarrh in two cases. In the four other cases no definite cause could be assigned. Indications for operation are: (1) chronic otorrhœa with caries of ossicles; (2) cholesteatomata in the tympanic cavity. In performing the operation, the ordinary forehead mirror, reflecting light from a good lime-light apparatus, answers every possible requirement. A general anaesthetic is essential.

Case I. E. B., female, aged 24 years; otorrhœa has existed on the right side for eight years; has suffered from frequent attacks of vertigo, tinnitus, and pain in the ears; hearing-power has been reduced to $\frac{1}{2}\frac{1}{2}\frac{1}{2}$ of normal; a large polypus, growing from the upper part of the tympanic cavity, protrudes through a perforation in Schrapnell's membrane. Operative treatment consisted in removal of the drum-head and the necrotic malleus, together with granulation tissue. As the result of this procedure, the pain and vertigo have entirely subsided, hearing has increased to $\frac{5}{6}\frac{1}{2}$ of normal, and a cicatricial membrane has formed.

Case II. A female, aged 34 years, has had otorrhœa on left side since childhood; hearing is reduced to $\frac{5}{6}\frac{1}{2}$ of normal; a polypus protrudes from the upper part of the drum-head; walls of the attic and the posterior wall of the external meatus are carious; the head of malleus is also carious. *Operation*: The diseased malleus was removed, together with granulations, and the carious bony walls were scraped. *Result*: Seven months after operation, hearing has increased to $\frac{1}{2}\frac{1}{2}\frac{1}{2}$ of normal; a new membrane has formed.

Case III. A female, aged 26 years; active otorrhœa from right side for twenty-one months. Purulent middle-ear catarrh has existed, probably, since childhood; tinnitus and pain in the

right side of head; right drum-head is almost destroyed, the malleus being denuded and surrounded with granulations; hearing, $\frac{1}{2}\frac{1}{2}$ of normal. *Operation:* Excision of the malleus. *Result:* Eight months after operation, disappearance of tinnitus and pain; stoppage of otorrhœa; hearing increased to $\frac{2}{3}\frac{1}{4}$ of normal; a new membrane is forming.

Case IV. A female, aged 6 years; otorrhœa in both ears, since an attack of typhoid fever, fifteen months ago; some pain; both drum-heads are almost entirely destroyed; the malleus in right ear is denuded and carious. *Operation:* Removal of malleus. *Result:* Within one week after, the ear had entirely healed and has remained well since; no sign of regeneration of the drum-head four months later.

Stress is laid upon the advantages gained from the excision of necrotic tissue, which are noticeable not only in improvement within the ear, but also in betterment of the patient's general health, since, in cases of chronic otorrhœa, the patients suffer, to some extent, from pyæmia. Five successful cases of excision, for suppurative disease of the attic, are also reported by C. W. Richardson, of Washington.⁶⁶ In general, the methods used by Burnett, of Philadelphia, and Sexton, of New York, were employed, but the author varied from these methods in his incision of the drum-head. With the trowel-shaped knife he transfixes the membrane just below the short process of the malleus, dividing the tendon of the tensor muscle and other ligamentous attachments of the ossicles in the attic. In withdrawing the knife he divides the membrane along the posterior border of the manubrium. A similar incision is then made along the anterior border of the manubrium, from the perforation above to the umbo. The malleus is then removed. If the incus is found to be diseased, the posterior flap of the drum-head is thrown back against the posterior wall of the auditory canal. The incudo-stapedial joint, being thus exposed, is divided and the incus removed. The posterior flap is then replaced and the operation is completed. By this means less injury is done to the membrane and quicker recovery is sure to follow. In one case only did serious complications develop. The patient suffered from acute nephritis, which may have been caused, possibly, by the etherization. Ether is the anæsthetic to be employed. Occasionally, the author has operated under sun-

light and found that the ear could thereby be efficiently illuminated, but Sexton's electric lamp is more reliable and satisfactory.

It would not be proper to close this outline report of excision work without presenting a darker side of this procedure than would be looked for from the facts stated in the papers from which extracts have been made.

H. V. Würdemann, of Milwaukee,¹⁰⁰⁷ reports a failure of an excision operation in a case of chronic aural catarrh. This operation resulted in the development of purulent inflammation of the middle ear, with total loss of hearing.

Case: Man, healthy, 60 years of age; deafness and vertigo. There had been a discharge from the right ear many years ago. The patient was totally deaf in this ear. Deafness had increased in the left ear, during a period of five years, and conversation was now carried on with difficulty. Bone and aerial conduction were best on the right (deaf) side; loud sounds, also, were heard. On the left side the watch could be heard on pressure, whisper at two centimetres, and voice at one and a half metres. The drum-heads were retracted, opaque, and chalky. The Eustachian tubes were patulous. In reporting the operation, there appears to be no mention made as to which ear was selected for operative treatment. The malleus and drum-head were easily extracted. Difficulty was experienced in bringing the incus into view, but no reckless gouging was done. It is not positively stated whether or not the incus was removed, but the article appears to leave the impression that this ossicle remained *in situ*. On the day following the operation the patient was found to be totally deaf in the ear operated upon, and complained of much vertigo. A few days later suppuration developed, but ceased in two weeks. In spite of subsequent treatment with mercurials, pilocarpine, electricity, and local treatment *per tubam*, the patient has continued, practically, "stone-deaf" up to the present time,—one year since the date of the operation. During this period the usual mobilization treatment of insufflation, the use of Siegle's speculum, and manipulation of the drum-head with a cotton-guarded probe has been employed in the other ear, and there has been a decided and satisfactory degree of improvement under this treatment. The author believes that haemorrhage into the labyrinth occurred during the progress of his operation, thus causing the symptoms which appeared afterward.

Another unfortunate result, from an excision operation, is reported by B. Alexander Randall, of Philadelphia.⁶¹ In this case *mastoid empyema and burrowing abscess of the neck were developed*. Excision of the drum-head and malleus were undertaken for the relief of chronic catarrhal deafness. The operation was done under ether. The incus was not extracted, but was pushed upward. No reaction followed until the fifth day, when high fever began, with severe pain and profuse muco-purulent discharge from the ear. This gradually lessened, under treatment, but, four weeks later, Bezold's form of mastoiditis developed. The mastoid was opened, and pus freed from the digastric fossa and neck. The antrum was opened freely. During the fortnight following, there were variation of temperature, oculomotor paresis, diplopia, and even suggestions of intra-cranial abscess. The patient recovered. There was no improvement in hearing. The author thinks that the incus was pushed upward into the antrum, closing the exit, and thus leading to the development of empyema. He also believes that this accident furnishes a strong indication for the removal of the incus in excision operations; even then, he states, the results may be negative or unfortunate.

NON-SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.

Treatment Other Than by Excision.—Walb¹¹ states that he has obtained good results from the use of Lucas's spring-pressure probe, in disease of the middle ear. In a few cases severe tinnitus disappeared; in others it diminished, while the hearing power improved. The procedure had to be carried out daily,—in a few instances, twice daily,—and, at each "sitting," pressure was made from fifty to sixty or even one hundred times. No local reaction followed. The treatment must be continued for months. It was not only in cases where bone-conduction remained good, while air-conduction was diminished, but, also, in cases of much lowered bone-conduction, that improvement was noted, the bone-conduction being restored. Walb concludes, from these facts, that our current mode of defining the seat of disease according to the preservation or loss of bone-conduction requires revision, and that certain morbid conditions of the air-conducting apparatus modify the bone-conduction very considerably.

As a method for producing mobilization of the ossicles and

stimulation of the aural-nerve system, the phonograph is recommended by Murray McFarlane, of Canada.²⁵⁷ Reports of two cases, in which systematic use of the phonograph was conducted, are cited as examples of the success possible to be obtained from this form of treatment. Case I: Mr. W.; otitis catarrhalis chronica, of six years' duration; watch heard in both ears,—two inches in right, four inches in left. After listening to the phonograph for fifteen minutes the watch is heard in right ear at six inches; in left ear, seven inches. Case II: Mr. M.; acute catarrh of left middle ear. Watch is heard at one inch, before treatment; after, at four inches.

Clarence Blake, of Boston,²⁵⁸ calls attention to the *mechanical treatment of tension anomalies*. This procedure is applicable to that class of catarrhal middle-ear cases, whose condition is so often unrecognized or treated as "plastic," which present relaxation of the drum-heads, tensor muscles, and malleo-incudal ligaments. Three cases are reported. The lesions manifested themselves in Case I, a violinist, by diminished hearing for qualitative overtones; in Case II, a soprano singer, by flattening "f natural" and "f sharp"; in Case III, a public speaker, by a very distressing, pulsating tinnitus. All of these patients had used Valsalvian inflation to excess, at first gaining temporary relief thereby. Treatment consisted in the adjustment of fine, India-rubber tissue strips to the drum-heads in such a manner that the ends of these strips were buttressed against the anterior and posterior walls of the fundus, while the convex side pressed against the short process of the malleus. The ossicular chain was thus made tense by outward pressure in directions similar to those caused by the action of the tensor muscles. In each case the symptoms were relieved. The author states that the adjustment of such mechanical appliances must always be a matter of more or less experiment, since the questions of weight and pressure will differ in individuals. The fact, therefore, that the rubber supports do not give immediate relief by no means justifies the conclusion that they cannot be of service, since the effect may follow later, or may be brought about more immediately by slight change in adjustment.

SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.

Treatment Other Than by Excision.—W. Arbuthnot Lane,²⁵⁹ advises *antrectomy as a treatment for chronic purulent otitis media*,

basing it upon the belief that the antrum is in reality a part of the middle ear, independent of its occasional connection with the mastoid cells; that it increases in size during the course of chronic otorrhœa, and is an obstacle to the cure of this condition, by simple methods; that its function is to secrete lubricating material for moistening the middle-ear cavity; that many mastoid processes are, normally, without cells, and, where cells exist, communicating with the antrum, this arrangement is a process of encroachment on the part of the cells; that in chronic otorrhœa the antrum retains pus, loses its anterior walls by pressure, and encroaches upon the dura, or communicates with the mastoid cells; that it cannot be cleansed from the external auditory canal; that when filled it interferes with aerial conduction, and hearing improves remarkably and permanently after antrectomy; that the facial nerve is in close relation to this chamber. The antrum is to be opened through the mastoid process by means of chisels. The cavity is then scraped with sharp spoons, removing the sides of the antral space. A metal tube is then inserted, with one end in this cavity. Free communication with the middle ear is to be established, the whole of the posterior boundary of the external auditory canal having been already excised, when the mastoid process was chiseled. Injury to the facial nerve must be avoided during this stage of the operation. Subsequently the patient must keep the parts thoroughly clean, and wear cotton in the auditory meatus.

Blennorrhœa of the Middle Ear.—Loewe, of Berlin,¹³⁸ thus indicates a form of otorrhœa caused by the presence of the pneumo-diplococcus. The treatment advised is the packing of the fundus and middle-ear cavity with absorbent dressing, to be renewed when soaked through. Failing to effect a cure within one week, the attic is to be exposed by opening the epitympanic bone, a dental engine being employed, and the packing applied within. If the discharge still continues, it is advised, in the course of this remarkable treatment, to open the mastoid cells by means of a dental burr. Where the drum-head is intact, this unique method cannot be used, but, to give the patient the benefit of this stuffing performance, the membrana propria is detached everywhere except at its junction with the flaccid membrane, and pushed back to the promontory. Where the muco-purulent element in an otorrhœa remains, the author insufflates some boric acid before ramming in the wad.

Curettement for Persistent Otorrhœa. — Garrigou-Désarnènes¹³⁶, reports three cases of persistent otorrhœa in which satisfactory results followed this method of treatment:—

Case I. A young girl; otorrhœa from infancy; general health good; drum-head almost destroyed, Schrapnell's membrane being also partially destroyed; while part of the manubrium had disappeared. The mucous surface of the tympanum was covered with granulations. There were areas of denuded bone anterior to the promontory, and along the superior part of the tympanic ring. Treatment consisted in carefully and thoroughly curetting the granulations; after which the parts were washed with an antiseptic solution, and small pledgets of cotton, with silk strings attached, and dipped in iodoform, were inserted as a dressing. These remained in place for five days, and, on removal, iodoform was insufflated into the parts. Healing occurred promptly, without pain or any unpleasant symptoms.

Case II. Here there was a large perforation in the drum-head; the tympanic cavity was filled with granulations, and the ossicles displaced from their normal positions. Treatment was conducted as for Case I, with complete healing as the result.

Case III. Otorrhœa had lasted for eight years; there was an exostosis in the external auditory canal. In operating, the exostosis was removed by the chisel. The tympanic cavity contained granulations, but was free from necrosis. The granulations were removed by curetting. This operation occurred more than one year ago, and there has been no discharge since. The hearing, in the ear upon which this operation was performed, has improved.

Influence of the Reclining Position, in Fevers, upon the Production of Otitis Media. — Würdemann, of Milwaukee,¹³⁷ states that, in fevers attended by post-nasal inflammation and excess of viscid mucus in this part, as well as in the pharynx, there is a well-recognized tendency in the middle ear to become inflamed. This tendency is all the more decided owing to the position of the patient, which encourages the collection of mucus about or in the openings of the Eustachian tubes. The author lays stress upon the necessity of using washes of salt solution, or of Dobell's mixture, in such cases, even before any symptoms of disease in the ears have been noticed.

A Case of Traumatic Deafness.—Bates¹ reports a case in which, after an explosion of dynamite, there was a condition of severe shock, a short period of unconsciousness, and sudden deafness, with a bloody discharge from both ears. Both drum-heads were perforated, the openings involving about half of the membrane's surface. The lower end of the malleus was uncovered in both ears. There was great loss of hearing, the loss of bone-conduction being in excess of loss of air-conduction. There was much tinnitus. A slight but temporary improvement of the aural symptoms followed inflation. The patient's general condition was that of profound physical depression, and to combat this state tincture of the chloride of iron was given, in doses of 10 drops, every half-hour. This was increased to a teaspoonful at the same intervals. These large, frequent doses were continued for one week. Under this treatment, the patient's general condition improved remarkably. The local treatment consisted in the well-known round of cleansing and insufflation, but a steady improvement was noted, so that hearing soon became normal; the perforation closed and the discharge ceased. The author thus summarizes the case: "May 28th, symptoms of nerve-deafness; June 9th, symptoms of middle-ear deafness; June 10th, recovery from middle-ear deafness."

Another series of traumatic cases is reported by J. E. Sheppard.⁶⁶ Treating of head injuries and aural complications, four cases are detailed, whose histories lead the author to draw the following conclusions: 1. Buck's division of fractures of the temporal bone into (*a*) fracture or diastasis of the tympanic and squamous portion, in the region of the middle ear, without implication of the pars petrosa; (*b*) fracture of both the tympanic and petrous portion is an entirely tenable and eminently practical one. 2. Fractures of the temporal bone, without fatal consequences, and even without loss of hearing, occur more frequently than is generally believed. 3. In suspected fractures of this part of the skull, a thorough examination—with speculum and reflected light—should be made as to the condition of the external auditory canal, the drum-head, and, as far as possible, of the tympanic cavity, for help in diagnosis and prognosis and indications suggesting proper treatment.

Gradle, of Chicago,⁶⁶ calls attention to the significance of the

odor of the discharge in the treatment of chronic suppurative otitis. From his experience he concludes (a) that, as long as the pus of otorrhœa smells fetid, the treatment employed has exerted no curative influence on the disease; (b) that the first sign of improvement is diminution of foetor.

The agents employed in treatment are: (1) cleanliness, obtained by irrigating the fundus with pure tepid water, by means of fine cannulae attached to flexible-rubber tubing; or, by passing warm salt water through the Eustachian tube, by means of a catheter and Politzerization; (2) a mixture of boric acid and one-sixth part of salicylic acid is advised; (3) Ole Bull's solution of 5-per-cent. hydrochloric acid instilled into the ear, in cases where necrotic bone is found; (4) alcohol-ether-iodoform solution, either alone or followed by the use of antiseptic glycerin, retained in the fundus by a plug of cotton.

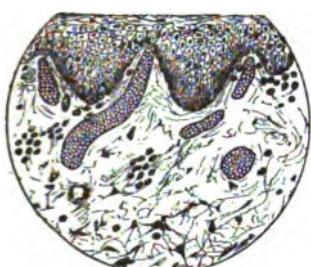
Where foetor cannot be overcome by these means and carious bone is found, this latter must be removed. The writer finds, however, that healing will occur without this removal, and that, in his experience, persistent foetor is more apt to be due to mastoid involvement without external signs, rather than to necrosed ossicles. "Whenever the pus remains free from odor, for the reason that it can drain freely, and is so copious that it does not stagnate, ordinary treatment will cure the otorrhœa with certainty."

Aural Polypi.—Richard Lake, of London,⁶⁶ considers that the most noticeable features of these growths are: 1. The frequent appearance of myxomatous tissue. 2. The similarity in appearance of aural polypi and scar-tissue. The growths examined were four cases of granulomata. They were without epithelium; rich in vessels; in one only was there a capsule, and in one true connective tissue. Fibromata, two cases, were also examined, showing coverings of squamous epithelium, and having a tendency to cystic degeneration,—fibroma myxomatoides.

Fig. 1 is from an example of this last-named growth, showing the deep ingrowth of epithelium and mucoid changes. Angiofibroma myxomatoides, Fig. 2. The degenerative changes undergone by the deep ingrowing epithelial columns may partly account for the formation of cysts, while other cysts are formed by mucoid degeneration of granulation tissue, best seen in fibromata. Gland tissue was not found. Plasma cells were present in large number

in granulomata and myxofibromata, but not in pure fibromata. The absence of epithelium outside and of fibrous tissue inside the granulomata suggests the idea that these tissues appear at about the same period in the life-history of the polypus.

Suppurative Otitis, Resulting from Tamponing the Post-Nasal Space.—Gelté⁴⁵⁴ reports that this accident occurred to a patient whose post-nasal space was tamponed, on the right side, to control epistaxis. The tampon remained in place for three days and a half. During this time the patient suffered, at first, extreme pain in the right side of the head; later, symptoms of cerebral inflammation were manifested. When the plug was removed, a discharge of thick, yellow pus flowed from the right ear and nostrils. Antiseptic washes were employed, the patient's symptoms were

FIG. 1.
STRUCTURE OF AURAL POLYPI.

(Archives of Otology.)

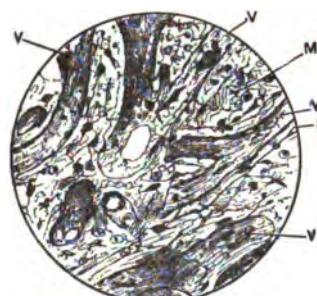


FIG. 2.

FIG. 1.—Section of fibroma myxomatoides; shows the great depth of epithelium, with myxomatous tissue deep in the section and connective tissue, with some pure fibrous tissue between these two tissues. Zeiss E.
FIG. 2.—Section of angio-fibroma myxomatoides. The vessels (V) are mostly cut longitudinally. They are thin-walled, and show the perivascular lymphatic sheath (S) in places. (M) Myxomatous tissue. Zeiss E.

promptly relieved, and he soon recovered completely. The author cautions against the unnecessary use of post-nasal tampons, as in most cases of epistaxis not due to traumatism the haemorrhage comes from an abraded surface on the anterior part of the nasal septum, which can be easily controlled by treatment directed to the bleeding-point, thus avoiding the danger of causing an inflammation of the middle ear.

THERAPEUTICS OF OTORRHœA.

Soluble salts of bismuth are strongly recommended by Garnault,²⁸⁶ July, Aug. the double iodide of bismuth and potassium being used. As a result of systematic investigation, it has been found that the salts of bismuth do not prevent the reactions due to soluble fer-

ments and are superior to the ordinary antiseptics, boric acid, resorcin, creolin, and nitrate of silver. After cleansing the ear, 5 to 6 drops of the salt are instilled into the ear, the solution being 1 per cent. in strength, made with a small amount of glycerin. If the medication causes pain, this solution can be diluted.

Sozoiodol is recommended by Grazzi ⁶²⁴, ⁸⁷ as a good remedy for otorrhœa. The drug is a combination of sulphur, iodine, and phenol. It is used in the form of the "sozoiodolate of potassium," either in an aqueous solution of 3 to 10 per cent., injected into the tympanic cavity through the perforation in the drum-head, or in the shape of a powder, 15 per cent. with talc., which is insufflated into the external canal.

Neutral borate, or tetra-borate, of sodium is recommended by Janicke, of Görlitz. ⁴¹ This salt does not precipitate immediately, from concentrated solutions, upon cooling; is non-irritating and antiseptic; and, for these reasons, may be applied readily to the tympanic cavity. It can also be used in powdered form by insufflation.

Delstanche ⁸⁸⁸, states that *liquid vaselin*, pure, or mixed with iodoform, has given great relief to pain, in acute middle-ear inflammation, while it

seemed to overcome any tendency to suppuration. Iodoformized vaselin was of especial service in cases complicating influenza.

New Instruments for Treating Diseases of the Middle Ear.—An apparatus for insufflating antiseptic air or medicated vapors and injections into the tympanic cavity, through the Eustachian tubes, has been devised by Gilles.¹¹ It renders the air to be insufflated antiseptic. In place of a series of instruments, there is only required this one convenient apparatus, allowing rapid transition from injection to insufflation, and *vice versa*, as often as necessary. The use of this instrument is not limited to irrigation of the tympanic cavity. It permits the use of a compact jet of fluid, or a spray, to irrigate all the cavities. A Hartmann cannula,



APPARATUS FOR INSUFFLATIONS
OF AIR.
(*Journal of Laryngology.*)

a sinus cannula, or a nasal olive may be fixed to the carrier. If medicated vapor, instead of fluid, is to be injected, the reservoir containing the solution can be charged with a volatile substance. The carrier will take the instrument suited to the cavity to which treatment is to be applied.

E. B. Dench, of New York,⁶⁸ has devised an instrument



FIG. 1.—INSTRUMENT FOR INFLATING THE MIDDLE EAR.
(*Archives of Otology.*)

which accomplishes the same purpose as the above, when vapors or pure air only are to be passed into the middle ear.

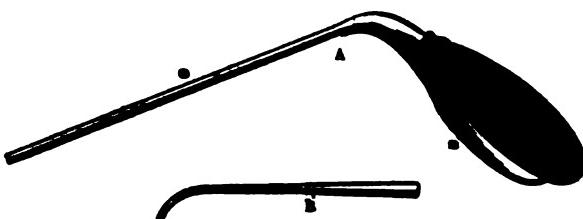
The stopper of the bottle is supplied with a thumb-screw, which, by turning one-fourth of a circle, allows air to pass through the bottle, filled with some volatile substance. By turning this screw in a reverse direction, the bottle is closed and pure air passes directly through the stopper, from the bulb to the middle



FIG. 2.—EUSTACHIAN BOUGIE.
(*Archives of Otology.*)

ear, per catheter. He has also devised a most convenient instrument, which forms a combined catheter and bougie. The catheter is of German silver, supplied with guides on its upper side, and ending in an elliptical opening. The bougie is of German silver, with bulb tips, varying from 2 to 5 of the French scale. After threading the shaft of the bougie through the guides and drawing the bulb to the first guide, the opening of the catheter is free, so

that inflation can be performed. The proximal end of the bougie is screwed into a handle. The advantages of the instrument are: reduction of friction to a minimum; ability to inflate the tympanic cavity while, at the same time, the bougie is in position for introduction; easy manipulation. No. 5 piano-wire, with roughened end, can be substituted for the bougie. Cotton, wrapped around the roughened end, can then be dipped into medicaments, and the



INTRA-TYMPANIC SYRINGE.

A. 1, rubber bag; 2, spoon-shaped metallic support; 3, straight tube.
B. Tube with curved nozzle, fitting on to 3.

(Archives of Otolaryngology.)

same applied directly to the interior of the Eustachian tube, at points determined by the graduated scale marked on the catheter.

Brieger, of Breslau¹¹, has devised a *syringe for supplying germ-free water*. A Berkenfeld filter, in a metal cylinder, is attached to the outflow-pipe of the syringe. These parts must be sterilized by boiling. Sterile water was obtained through this

syringe, even when a copious supply of a pure culture of staphylococcus pyogenes aureus had been mixed with the water from which the pump was charged. The apparatus diminishes the force of the stream only to a small extent.



STEAM-Sterilizer.
(Journal of Laryngology.)

A handy form of intra-tympanic syringe has been invented by Urban Pritchard.¹² This instrument explains itself. The handle is a small, oval, rubber bag, set at an obtuse angle with the tube. Beneath this reservoir is a spoon-shaped metal plate, offering a point of resistance when pressure is applied to the bag by the surgeon's thumb. A curved tube can be substituted for the straight one, when needed.

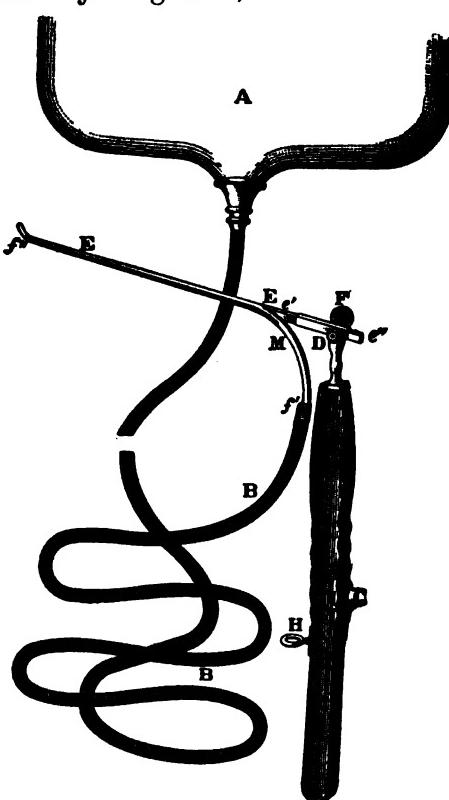
A Steam-Sterilizer for Aural Catheters.—John Bark, of Liverpool,¹³ is the inventor of this instrument. The little metal globe, A, is half-filled with water, and the top, B, screwed on. The

large end of a catheter is placed on the nozzle, C, and the globe is then held over a spirit-lamp by forceps passed through the ring, D. A powerful jet of steam is thus forced through the catheter, and the latter is afterward immersed in some antiseptic fluid.

A new intra-tympanic syringe has been devised by Milligan, of Manchester, Eng.¹¹

A is a small reservoir for the injecting fluid, and can be suspended by a pulley arrangement. B is a fine rubber tube, passing from the reservoir through the ring, H, in the handle of the cannula, to the end of the cannula at M. The cannula is attached to the handle at D. The syringe is so held in the operator's hand that the index finger of his right hand is in the curve of the tube at M, and the little finger of the same hand is against the handle, just below the eyelet, H. His third and fourth fingers are free to press the rubber tube and control the passage of fluid.

This cannula can be introduced into the tympanic cavity, held firm and immovable, while the fluid, easily stopped or started, flows steadily at a pressure regulated by the height at which the reservoir is placed.



A NEW INTRA-TYMPANIC SYRINGE.
(*Journal of Laryngology, Rhinology, and Otology.*)

INTERNAL EAR.

Destruction and Partial Ossification of Both Labyrinths, Probably in Consequence of Meningitis.—H. Steinbrügge, of Giesen,¹² describes the case of a child, 10 years old, who died, apparently, from meningitis, which had lasted about fourteen weeks. The drum-heads indicated the results of a sclerosing process in the

middle ear. In the labyrinth were found the well-known consequences of intense inflammation. The lower turn of the left cochlea was filled with connective tissue to a greater extent than were

the upper turns. The new-formed connective tissue extended into the aquæductus cochleæ, and the lower turn contained many vessels with ruptured walls, from which extravasation had taken place. Portions of the contents of the upper turns of the ductus cochlearis were found to be destroyed; there were only a few cells in the location of Corti's organ. The ligamentum spirale was partially detached from the scalæ, and isolated tracts of connective tissue passed through the upper scala. Reissner's and Corti's organs were wanting here. The membrane of fenestra rotunda was thickened on both sides. The nerve-fibres of the acoustic nerve had, in most part, degenerated and undergone fibrous change; they were almost entirely destroyed at the entrance of the central canal of the modiolus. The vestibule, the ampullæ, and the semicircular canals



FIG. 1.



FIG. 2.

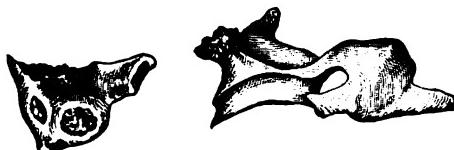
DESTRUCTION AND PARTIAL OSSIFICATION OF BOTH LABYRINTHS, PROBABLY IN CONSEQUENCE OF MENINGITIS.

(*Zeitschrift für Ohrenheilkunde.*)

were filled, partly with connective tissue and partly with bone, the ossification being most advanced in the semicircular canals, which were, on this account, scarcely to be recognized. The new-formed tissue was very rich in blood-vessels. The right labyrinth

corresponded, in general, to the left, in its lesions. The consecutive ossification of the periosteum detached from the wall of a semicircular canal, as shown in Fig. 2, is remarkable. It undoubtedly occurred at the beginning of the inflammatory process, and remained limited to a portion of the periphery of the bony canal. The membranous semicircular canal was destroyed, and the greater portion of the bony canal was filled with connective tissue, having thin-walled vessels with groups of corpuscles outside their walls. The ossification began here, apparently, in the adherent periosteum. (Fig. 2, a.)

The base of the stapes was detached and almost luxated, and the annular ligament was destroyed from processes which had acted, evidently, from within outward. It is also of interest to see that, with a duration of fourteen weeks only, there should have been so complete a filling up of portions of the semicircular canals



PRIMARY LABYRINTHINE NECROSIS AND FACIAL PARALYSIS.
(*Archives of Otology.*)

with bony masses, as shown by Fig. 1. It indicates that the absence of semicircular canals, occasionally reported, as well as the absence of other portions of the labyrinth, which the earlier anatomists regarded as a congenital defect, may, in many cases, be explained as being due to inflammatory changes occurring in youth.

Primary Labyrinthine Necrosis, with Facial Paralysis.—Max Toeplitz, of New York,⁶⁶ reports such a condition, illustrating his article by above figures. These sequestra were removed from the left ear of a child, 6½ years old, suffering from otorrhœa, which had followed an acute otitis, complicating scarlatina. The child had much vertigo, and was confined to bed for six weeks. About three weeks after the development of otitis, the right side of the child's face became paralyzed. This diminished gradually during a course of aural treatment, consisting in the removal of exuberant granulations, and, finally, in the removal of the two sequestra, which were portions of the cochlea.

The accompanying plate and explanation is from an article by Moos,²² on a "Further Examination of the Labyrinths of Six Petrous Bones, from Children Who Have Died of Diphtheria." The plate represents a portion of a sagittal section from the membranous, horizontal, semicircular canal, medial crus; child 2 years old; scarlatinal diphtheria of five days' standing; diphtheritic inflammation, with formation of pseudomembranes in naso-pharynx and larynx; necrosis of mucous membrane. The labyrinthine ligaments are partly destroyed, together with their endothelial linings; the membranous canal, therefore, collapsed. K = bone; P = periosteum; L L = labyrinthine ligaments; G = blood-vessels. Where the ligaments are still preserved, the cellular elements are well-nigh completely destroyed. Instead of the nuclei of the layer of the connective tissue, molecular products of disintegration are seen. The same holds good for the epithelial layer of the membranous semicircular canal. Distinct structure of nuclei and epithelia of the membranous semicircular canal are only exceptionally observed with large magnifying power. Clusters of products of disintegration are seen in the endolymphatic and, also, in the perilymphatic space. These cover partially the propria, which has thereby somewhat lost its sharp outlines.

Physiological Importance of the Labyrinth.—Kreidl²³ has investigated this subject, basing his experiments upon the observation of Linje,—that any individual, rotated on his own axis, will soon find himself attacked with nystagmus; but, in the case of a perfectly deaf person, this symptom will be absent. As a result of Kreidl's experiments, following this idea, he concludes that these experiments tend to show that the otolith apparatus is the special organ of sense for correcting our position in space, and might be properly termed the static sense.

Extensive Destruction of the Auditory Nerve in All the Turns of the Cochlea.—Bezold and Scheibe, of Munich,²⁴ have made a careful investigation of a case presenting this extensive lesion. The patient had suffered from deafness in both ears, which had commenced twenty-three years ago, but had increased to such a degree that conversation was heard by the right ear at six inches only; not at all by the left ear. In the early years of deafness, there had been attacks of vertigo without nausea. Subjective noises were noticed occasionally. Six years before death, the patient was



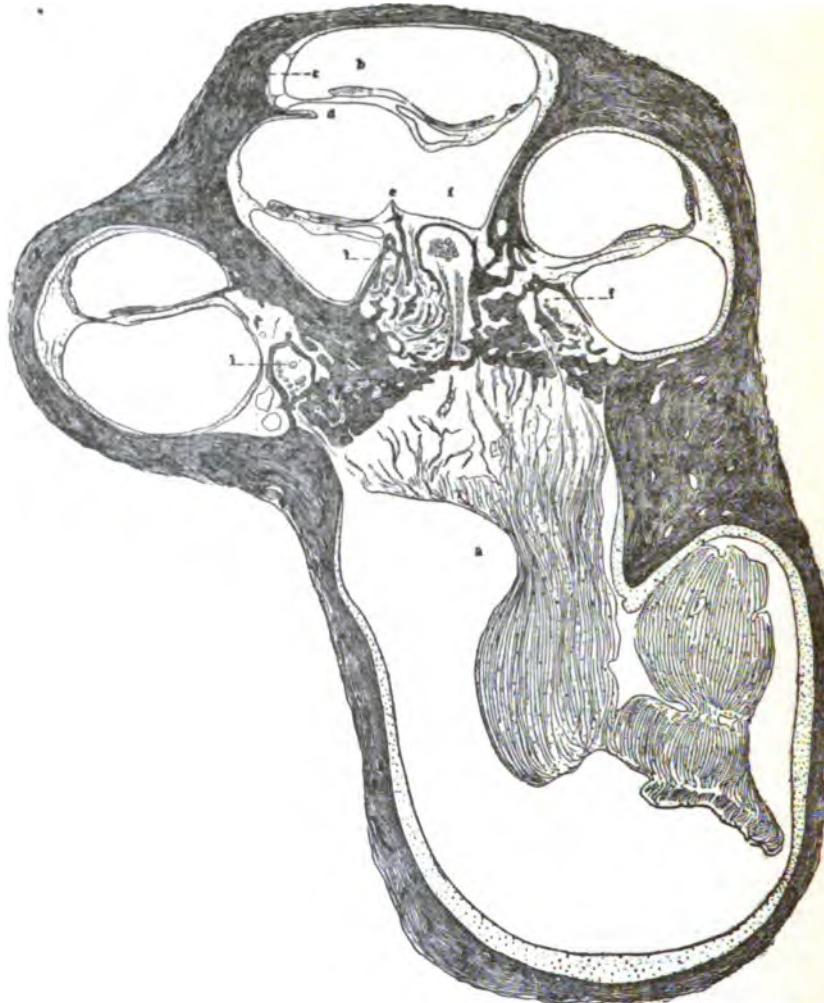
Pyramidal of petrous bone
arteriæ squæath from Diphtheria.(Moos).
Zeitschrift für Ohrenheilkunde.

attacked with basilar meningitis, and began the use of morphia. There was decided degeneration throughout the bony structures of the body, and the vertebræ and spongy part of the petrous portion of the temporal bone could be cut without decalcification. Examination was conducted upon the left ear. The only decided abnormality in the middle ear was a partial fixation of the stapes or its annular ligament. The examination of the labyrinth showed, as the principal change, a marked deficiency in the number of nerve-fibres, in equal degree in all the turns of the cochlea. In the entire course of the ganglion spirale, the greater part of the ganglion cells were destroyed, and, in their place, in the half of Rosenthal's canal toward the modiolus, were empty spaces. A communicating system of cavities extended through all the turns of the cochlea. Corti's organ was damaged in all the turns; while, in the apex of the cochlea, there was no trace of it, or of the cellular covering of the lamina spiralis membranacea.

Reissner's membrane was present only in the vestibular portion of the cochlea. The most marked changes were found in the third turn. Here, the bony portion was, in part, wanting. The second turn communicated with the third, through a perforation in the bony wall. The perforation reached, internally, to the modiolus; externally, there was a small rim of bone remaining. The periosteum passed, in part, from the upper surface of the latter, uninterruptedly over the free margin, to the lower surface (see cut, next page), and, in part, continued forward in new-formed connective-tissue membranes, which formed a septum (not shown in the figure). The modiolus and hamulus were also almost entirely wanting in the third turn. The crista was fairly-well preserved and appeared normal in the other turns, but does not take the stain, and no cell-nuclei were to be seen (see cut, b). No cells were found in the membrana basilaris, upper half of the ligamentum spirale, and the neighboring periosteum. The stria vascularis and the prominentia spiralis, elsewhere normal, were here represented by a layer of flat epithelium.

The bone of the cochlea capsule, where it is covered by the ligamentum spirale, showed, in the third turn, a shallow, irregular defect (see cut, c). In the last portion of the apex turn, all the structures of the ductus cochlearis, together with the crista spiralis, were wanting. The vestibule and semicircular canals were

almost normal. The nerve-twigs for the ampulla of upper semi-circular canal was atrophic. The pathogenesis of this case is doubtful.



EXTENSIVE DESTRUCTION OF LABYRINTH.

Section perpendicular to the long axis of the pyramid. Absence of the nerve-fibres and of a greater portion of the ganglion cells in all the turns. a, ampulla-formed cavities in the substance of the cochlea nerves; b, crista spiralis with no cells; c, superficial defect in the bone; at d and e, defect in the wall between the second and third turns; f, ganglion spirale.

(*Zeitschrift für Ohrenheilkunde.*)

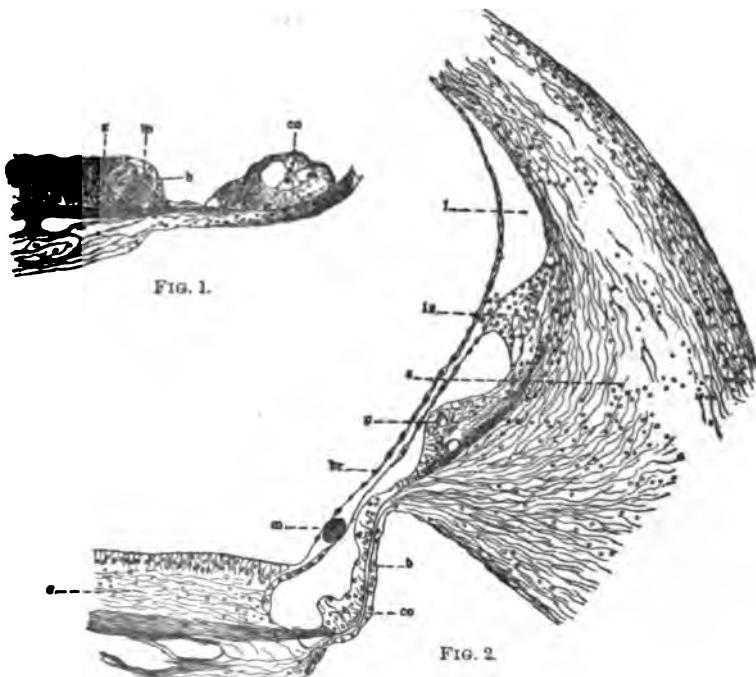
Distinction between Arterial Murmurs and Labyrinthine Disease.—Richardson³³ cautions against the useless treatment of the middle ear for supposed disease of the labyrinth, when the subjective symptoms noted are really due to cardiac murmurs, aneurism

of a part of the circle of Willis, or friction of blood through the artery in the carotid canal. As to treatment, the use of iron and purgatives is recommended, in anaemia; an iodide or hydrogen peroxide with iron, for specific cases. As a sedative, applicable to all severe pulsating cases, 15 to 20 minims (0.90 to 1.25 grammes) of hydrobromic acid is advised, with $\frac{1}{2}$ fluidounce (15 grammes) of digitalis infusion, in sufficient water to make 1 $\frac{1}{2}$ fluidounces (45 grammes).

Deafness Caused by Hereditary Syphilis.—Holger Mygind, of Copenhagen, corresponding editor, reports the following case illustrative of this condition: Anna S., aged 19 years; mother had syphilis, and four of her children were still-born. At 7 years of age the patient suffered from some affection of the eye, characterized by photophobia and progressive dimness of sight, lasting for four months, but disappearing while sight was gradually recovered. When 14 years old the patient began to be somewhat deaf. At 15 years of age she suffered from "hip-joint disease," which has left no trace. During this illness, on waking, one morning, she found herself totally deaf; also experienced tinnitus and vertigo. Tinnitus gradually subsided to a degree; vertigo slowly disappeared, but the total deafness has remained unchanged. The patient shows no sign of hereditary syphilis. The drum-heads are sclerosed, retracted, and adherent. Hearing is *nil* for both sides. Some naso-pharyngeal catarrh exists.

In regard to conditions such as this case presents, it may be said that this form of aural disease is very infrequent; that it appears most often in females, and manifests itself between the ages of 11 and 17 years, although Hutchinson reports one case at 25 years of age, and Meyer found one as early as the fourth year. The principal cause is syphilis, yet such cases of deafness may occur at puberty, without the possibility of tracing any hereditary taint. The value of such negative evidence must not, however, be overestimated, as inherited syphilis often presents obscure lesions, and histories may be unreliable. The symptoms are: deafness, occurring suddenly and without premonitory symptoms, very pronounced in degree, bilateral; sometimes the function of the auditory nerve is completely discontinued,—at least, upon one side. Remissions with exacerbations are sometimes noticed. Tinnitus generally accompanies the deafness, very marked in

degree, until the deafness is complete. Vertigo is a constant accompaniment of the disease from the beginning. There may be giddiness, or a slightly staggering gait, persisting for years. Occasionally, vertigo is so severe as to prevent the patient from standing, while nausea also is pronounced. Disease of the cornea, iris, and choroid is very characteristic of hereditary syphilis, and is found frequently in connection with the aural disease. The



AUDITORY ATROPHY AND ANOMALIES OF DEVELOPMENT IN THE MEMBRANOUS LABYRINTH OF BOTH EARS IN A CASE OF DEAF-MUTISM.

FIG. 1.—*co*, Corti's organ; *z*, increased cells in the sulcus spiralis; *m*, Corti's membrane.

FIG. 2.—*a*, semilunar stratum; *c*, crista spiralis; *b*, basilar membrane; *co*, Corti's organ, badly preserved; *p*, prominens spiralis; *br*, bridge; *l*, lacuna in the stria vascularis; *ls*, ridge with attachment to the lower part of the bridge; *m*, rudimentary Corti's membrane.

(*Zeitschrift für Ohrenheilkunde.*)

most frequent form of eye disease, in this connection, is interstitial parenchymatous keratitis.

Baratoux, as a result of forty post-mortem examinations of children who had suffered from this aural condition, found abnormalities of the blood-vessels of the internal ear, causing aneurismal expansions and haemorrhages. Authorities vary in opinion as to the seat of disease within the ear. Mygind believes that the symptoms can all be explained as resulting from a labyrinthine

affection, but acknowledges that catarrhal disease of the middle ear is not infrequent in cases of hereditary syphilis. This middle-ear disease may not play an important rôle in the loss of hearing, but may have some influence as the primary cause of the labyrinthine disease. Prognosis is absolutely bad, and, for treatment, it is only advisable to try general antisyphilitic procedures, or hypodermatic injections of pilocarpine.

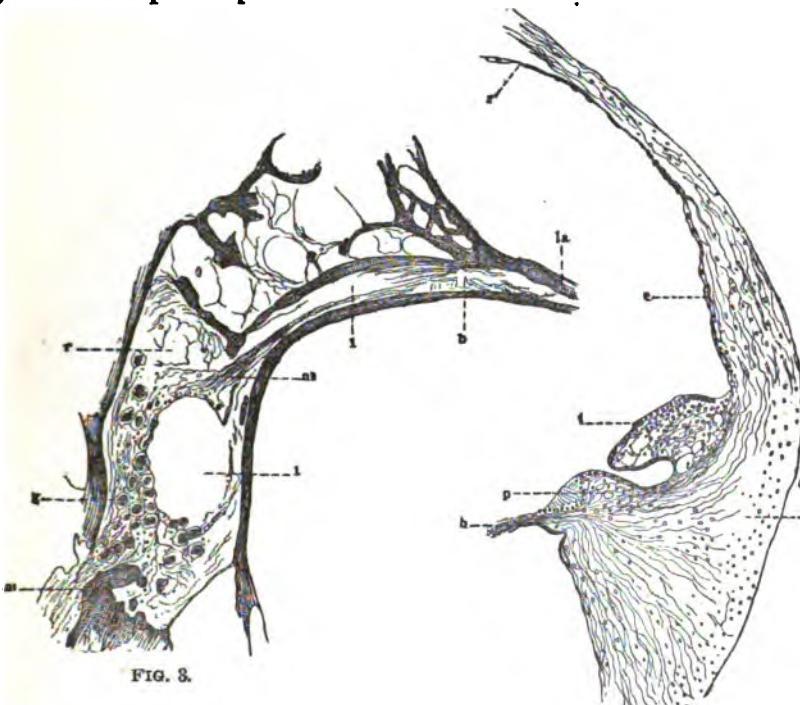


FIG. 3.

FIG. 4.

AUDITORY ATROPHY AND ANOMALIES OF DEVELOPMENT IN THE MEMBRANOUS LABYRINTH OF BOTH EARS IN A CASE OF DEAF-MUTISM.

FIG. 3.—r, Rosenthal's canal; la, lamina spiralis ossea; g, ganglion cells; l, lacuna; nl, entering nerve-fibres; n2, departing nerve-fibres; b, connective tissue.

FIG. 4.—s, stratum semilunare; b, beginning of basilar membrane; p, prominentia spiralis; l, ridge on the stria vascularis; o, flat cells on the rest of the stria; r, a piece of Reissner's membrane, bulged forward toward the scala vestibuli; inserted somewhat peripherally, and extending, farther on, in a thicker layer of cells.

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Barclay, of New York,⁹ reports the sudden loss of hearing in a girl, 12 years of age, whose family history was strongly suggestive of inherited syphilis. Loss of hearing occurred at the time of eruption of the molar teeth, a short time before puberty. Attention is called to this fact and to the existence of a predisposing cause of deafness, a chronic catarrh of the ear, already existing

before the onset of the later symptoms. The exciting cause appears to have been reflex irritation from the simultaneous eruption of the second molar teeth.

Deaf-Mutism with Auditory Atrophy and Anomalies of Development in the Membranous Labyrinths of Both Ears.—Arno Scheibe, of Munich, ¹⁸ describes the case of a patient, a deaf-mute aged 47 years, who died of phthisis. As a result of detailed examination, the middle ear was found to be normal, except for a hyperplasia and degeneration of the tensor tympani muscle. The labyrinth showed atrophy of the nerves of the cochlea, sacculus, and posterior ampulla, as well as alterations in the membranous structure of the cochlea and sacculus. The latter are simple anomalies of formation. The deaf-mutism must be regarded as due chiefly to the atrophy of the nerves. In the labyrinth, there is no trace of a former inflammation. The case thus differs from all similar ones before reported. (See Figs. 1, 2, 3, 4, pages 36 and 37.)

V. Uchermann, of Christiania, reports the findings in *a post-mortem examination of the ears of a deaf-mute*. The case was that of a young man, aged 18 years, who died from pulmonary and intestinal tuberculosis. When 2½ years old he suffered from scarlatina, and, as a result, became a deaf-mute. In the right ear the pathological conditions were confined to the labyrinth, and consisted of destruction of its integral parts, the various spaces having undergone ossification. The drum-head and tympanum were quite normal. The ligamentum annulare stapedis and the membrana fenestræ rotundæ were ossified; but this process was confined to the sides adjoining the inner ear. In the left ear were found otorrhœa, ossification of the spongy portion of the pars petrosa and of the processus mastoideum, and ossification of the membrana fenestræ rotundæ; the ligament of the stapedius muscle was movable. The inner ear showed no sign of pathological fluid or new formations. The surface of the brain showed no abnormality. Broca's convolution appeared smaller than normal. The superior temporal convolution of the left side was also smaller than usual. The microscopic examination did not show any positive signs of abnormality. These cerebral changes are supposed to result from atrophy consequent upon the inactivity of the parts, it being worthy of note that this left-sided atrophy is associated with destruction of the right labyrinth. As a consequence of Munk's examination, there is good

ground for the belief that the fibres of the acoustic nerve cross in the brain.

A histological examination was made by Moos,²⁴⁴ of Heidelberg, of two temporal bones of a child, whose death was caused by basilar and cortical meningitis, three years after an attack of scarlatina, which had caused profound deafness.

The child had suffered from scarlatina and diphtheria, and, during this illness had great pain in both ears, otorrhœa, vertigo, and almost complete loss of hearing. Otorrhœa continued after this attack, and, three years later, the patient contracted measles, during which illness the aural symptoms became worse, and the child died from meningitis. The right temporal bone showed much secretion on the bony walls of the auditory canal ; drum-head was destroyed entirely ; malleus and incus had disappeared ; stapes was movable, but less so than normal ; bony part of Eustachian tube was very narrow ; mucous membrane of the labyrinth was grayish white in color, that of antrum red and thickened ; lower part of the tympanic cavity was filled with pus. The left temporal bone showed much pus in the external auditory canal, also in the tympanic cavity. The malleus and incus had disappeared. The stapes was movable. The mucous membrane of the narrowed Eustachian tube and of the antrum was very red in color. The drum-head was completely destroyed. The lower border and labyrinth wall were covered with ingrowing epidermis, which had invaded these parts from the drum-head. In the labyrinth of the right side was found a considerable quantity of horny epidermis, in layers, with true rete Malpighii and papillæ, resembling the cutis of the external auditory canal ; there were, also, concentric layers of epidermis encapsulating epithelium.

The post-mortem examination indicated the results of two different processes, the earlier of which had developed a pan-otitis of both sides, occurring three years before death, caused by scarlatina, and producing the following lesions : destruction of the drum-heads ; exfoliation of the malleus and incus ; dislocation of the stapes, on one side, and necrosis of bone, which had undergone a process of healing ; fibrous degeneration of the tensor muscle ; cystic degeneration and atrophy of the mucous membrane upon one side ; an invasion of the epidermis from the cutis of the drum-head on both sides ; a new formation of bone in the first turn of the

right cochlea; fibrous degeneration of the lamina ossea and destruction of the organs of Corti; serious changes in the second and third turns of the left cochlea; atrophy of the ganglion spirale on both sides, and of the zona ossea on both sides.

The second and later process had developed during the final attack of otitis. It had caused a new necrosing inflammation in the canal of the facial nerve, and the border of the niche of the oval windows. There had been produced inflammatory changes in the vestibule on both sides: great destruction of the acoustic nerve and of a part of the facial nerve on both sides, by purulent inflammation and haemorrhage. The accompanying figures and explanation will indicate the importance and extent of the lesions found.

Explanation of Plates.—Fig. 1. A sagittal section through the centre of the horizontal semicircular canal of the left side. The spaces of the endolymph are entirely wanting, and a great part of that of the perilymph. The bony walls have entirely disappeared. The margin is altered into a concavo-convex form, irregular, in consequence of an earlier necrosis, the result of which is shown at KMK. The smaller perilymphatic space is extensively filled up, partly with blood-corpuscles, partly with granular cells. The whole interior consists of thickened connective tissue, empty blood-vessels, and others filled with corpuscles and fatty detritus.

Fig. 2. A portion of the above section is indicated, in which new growth of bone is seen.

Fig. 3. A sagittal section through the cochlea of the left temporal bone, showing the first turn of the cochlea; N, remains of the nerve-branches of the first turn, haemorrhagic and purulent infiltration; G, vessels with thickened walls; rgs, region of the ganglion spirale. The ganglion is cut through by pressure of the bone, the remaining portion consisting of connective tissue and shrivelled ganglion cells. St, scala tympani, its inner space almost obliterated by exostoses; the portion not thus obliterated is partly filled with connective tissue and blood-vessels. Sv, scala vestibuli, a great portion of which is filled with new-formed bony tissue. In the space not so occupied can be seen some remains of Reissner's membrane, rm, standing in profile, from the upper surface, without its cell attributes. Here, too, besides molecular detritus, is a smaller and a larger conglomeration of lymph cells; on the larger one can be seen the laminated structure of the formation. Lsp, ligamentum spirale, containing osseous tissue. Csp, crista spiralis, the portion lying between the organs of Corti, is entirely absent. Lpo, lamina spiralis ossea, abnormally contracted, the light striæ indicating atrophy of the nerves of the zona ossea.

Fig. 4. From a sagittal section through the wall of the labyrinth, left side, in the region of the niche of the oval window. No, niche of oval window. Stp, foot-plate of stapes. Gckn, scar-tissue from bone which has healed after necrosis. Ny, facial nerve. Rpl, isolated branch of the plexus tympanicus, beneath mucous membrane, which has undergone epidermal change. Sq, three sequestra of bone, varying in size and form, surrounded by hypertrophied mucous membrane. Hz, horseshoe-formed boundary of a former necrotic process, on the upper surface of the wall of the labyrinth, filled with dense connective tissue; single spaces are to be seen caused by a former destruction of connective tissue, and separate groups of granular cells stained black by osmum. The contour of the still-existing bones shows the characteristic appearance of necrosis; likewise the lateral bony border of the Fallopian canal, the latter in a still higher degree. To the side of the latter lie accumulations of black, osmium-stained, granular cells. The epithelium of the mucous membrane of the niche of the oval window is loosened. The upper surface contains numerous layers of epidermis. It is infiltrated throughout, partly with small cells undergoing fatty degeneration, whose structure cannot be shown by staining; partly with black, osmium-stained, granular cells.

Fig. 5. A section of one of the bridges of epidermis, extending between the lateral wall of the facial canal and the body of the stapes. Here is seen a simple horny layer; beneath this

Fig. 1.



Fig. 2.

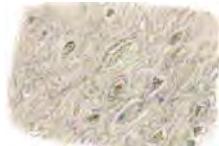
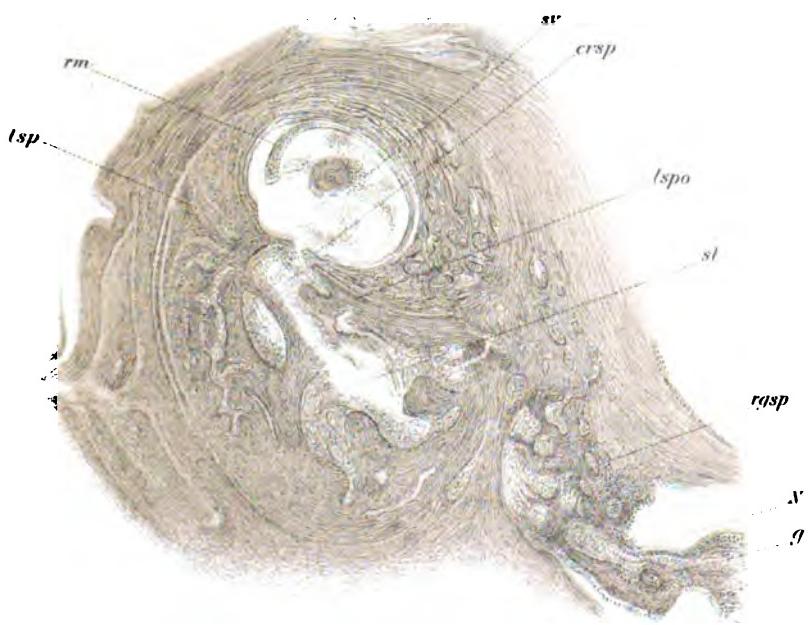


Fig. 3.



Histological conditions of temporal bones in a
case of deafness resulting from Scarlatina.(Moos).

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Fig. 5.

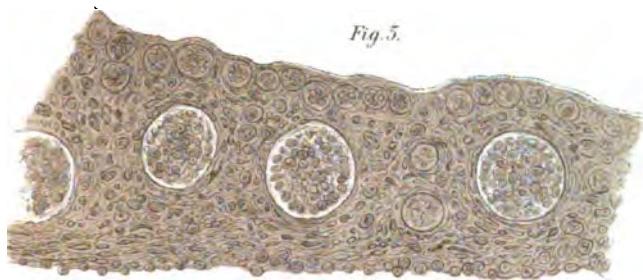


Fig. 6.

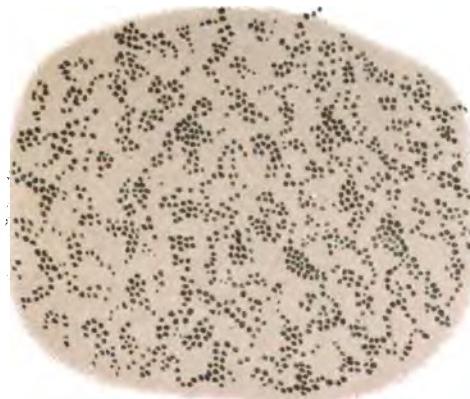
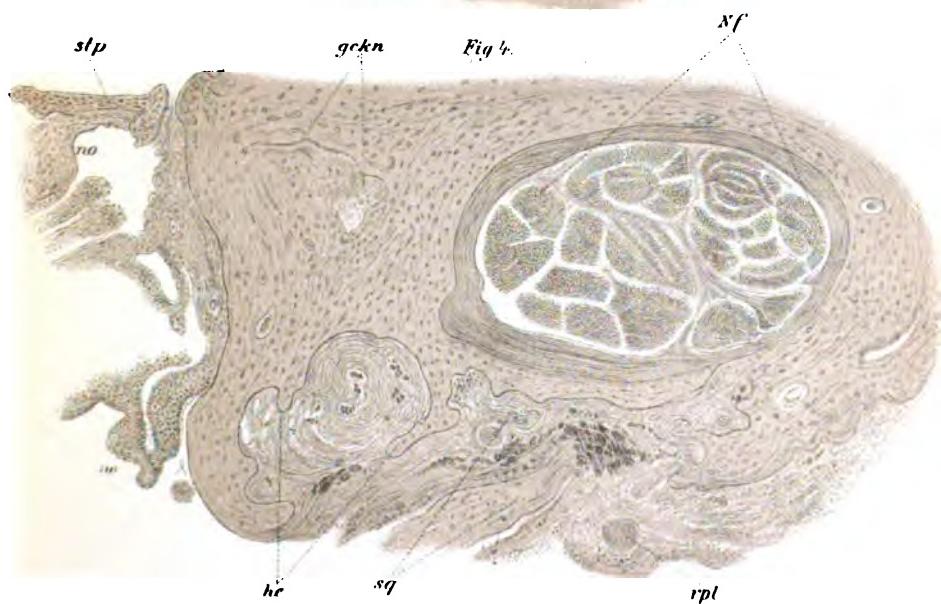


Fig. 4.



Histological conditions of temporal bones in a case of deafness resulting from Scarlatina.(Moos).

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are found numerous cells extending in different directions, of different forms, and retaining their nuclei. A greater part of the cells without nuclei is encapsulated by one or more concentrically-arranged layers of epidermis. The encapsulated portions are in some instances round, in others oval, in form, and vary greatly in size.

Fig. 6. Micrococci and staphylococci, from a necrotic bone-canal of the cochlea, left side.

Abscess of the Brain from Aural Disease.—After reviewing the reports of one hundred cases of cerebral abscess caused by aural disease, Körner⁸⁸⁶,₁, draws the following conclusions: 1. Children under 10 years of age are seldom affected with cerebellar abscess, the posterior fossa of the skull, in a child, being quite distant from the auditory meatus. 2. In a large proportion of cerebral abscesses resulting from suppurative otitis, and developing near the seat of the primary affection, continuity with the same can be demonstrated. Therefore, in order to avoid trouble later, after an apparently brilliant result, besides emptying the abscess-cavity, the diseased bone should be sought and removed. 3. Although not positively proven, it seems probable that abscesses of the brain, following disease of the petrous bone, lie in the portion of the brain immediately adjoining this area, in the temporal lobe, or in the half of the cerebellum on the same side. 4. As complications, thrombus of the venous sinus was found seventeen times on the right side, five times on the left; in ninety-one autopsies, suppurative meningitis was found seventeen times, rupture into the lateral ventricle ten times, into the fourth ventricle once. The frequency of the complications does not permit the conclusion that these abscesses cannot be operated upon in their early stages. 5. Regarding diagnosis between otitic abscesses in the temporal lobe and the cerebellum, these points must be borne in mind: (a) age, —cerebral abscesses are three times as frequent as cerebellar in children under 10 years old; (b) seat of primary bone-lesion; (c) labyrinth disease does not certainly indicate cerebellar abscess; (d) location of painful area by percussion. 6. Pain, vertigo, and optic neuritis are uncertain signs. 7. Disturbances of speech occur in cerebral affections only, but are seldom met with on account of the preponderance of right-sided abscesses.

Function of the Semicircular Canals.—E. D. Spear,⁸ details a case, in illustration of the relations existing between the semicircular canals and the vestibular branch of the auditory nerve with the muscles of the eye and other parts of the body, in maintaining equilibrium.

Case: The patient, a strong man, suffered from hypertrophy of the posterior end of the lower turbinated body, right side. In consequence, the Eustachian tube of the same side was closed. There was intense pain in the right ear, with the other symptoms of acute otitis media. The patient suffered, also, from vertigo, staggering to the right, and nausea, complete ophthalmoplegia interna of the right side, due to paresis of the internus muscle, and diplopia. A large tampon of cotton, wet with a 4-per-cent. solution of cocaine, was carried deeply into the right nasal fossa, and remained in place for ten minutes. At once, upon the removal of the cotton, the patient converged his eyes normally, could walk in a straight line, had complete relief from pain, and became convalescent. Irritation had resulted from intra-tympanic and intra-labyrinthine pressure, and was transferred through the vestibular branch of the auditory nerve to the space centre, and through it to the terminal fibres of the sixth nerve, causing stimulation of the muscle supplied by it, and bringing about the divergence simulating paresis.

MASTOID.

Cerebral Abscess After Acute Otitis Media; Healed by Operation.—Truckenbrod, of Hamburg,⁶⁶ reports this case, in which the patient, in addition to a small perforation in the left ear, from which a secretion—abundant, creamy, and violently pulsating—flowed, presented also the following cerebral symptoms: temporal pain, slight paralysis of the right facial nerve, partial aphasia, and paresis of the right arm. The temperature was not above 100° to 101° F. (37.8° to 38.3° C.); the pupils and fundus were normal; no vomiting or anaesthesia. The temperature rose to 103° F. (39.4° C.), and symptoms became worse. An operation for opening the mastoid was performed, but revealed only some caseous exudation. The roof was chiseled through, the dura exposed, and no trace of pus found, although the dura was tense and extremely hyperæmic. An exploratory puncture, with a delicate needle, was then made, the direction being forward and upward. Pus and a bright liquid to the amount of 60 grammes (2 ounces) were evacuated. A drainage-tube was inserted, and the patient progressed to complete recovery; the fever, paralysis, and pain disappeared at once, and the normal mental condition returned.

A somewhat similar case is reported by Baginsky and Jansen,

of Berlin,⁶⁰ in which the abscess was located in the temporal lobe. The patient was a child 5 years of age. Three weeks after the removal of a pea from the ear, a procedure attended with some purulent discharge, the child developed symptoms of meningitis, which progressed rapidly. About three weeks after the first appearance of these symptoms, the dura was exposed by removal of a piece of bone, about the size of a one-mark piece, from the temporal bone. Upon opening the dura considerable serous fluid escaped, and a deeper cut into the temporal lobe set free some greenish-colored pus. Lysol was used as an antiseptic wash, and the wound was tamponed with iodoform gauze. There was no reaction following this operation, and the case has progressed favorably.

The results in a second case of Jansen's were not so fortunate. The driver of a locomotive, 46 years of age, developed acute purulent otitis media, with involvement of the mastoid. The mastoid cells were opened and a large quantity of pus was withdrawn. On the fifth day after the operation symptoms of cerebral involvement began to show themselves. These advanced rapidly, manifesting themselves by vertigo, impaired movement of the left arm, facial paralysis, paralysis of the lower limbs, and mental hebetude. There was no fever or slowing of the pulse. An opening, about the size of a two-mark piece, was chiseled from the squama. The dura did not show an inflammatory process. A puncture through it was made with a three-millimetre trocar, two centimetres in depth, inward and upward. Considerable non-fetid pus escaped. There was no loss of cerebro-spinal fluid. The parts were dressed with iodoform gauze. The symptoms of paralysis disappeared from day to day, in about the reverse order of their development, and the patient's condition was excellent. The skin over the abscess-cavity was sunken in, and pulsated plainly. Without the surgeon's consent, this patient left the hospital, and almost immediately became worse, developed his former symptoms of paralysis, and died, eight days after leaving hospital.

E. B. Dench, of New York,⁶¹ reports two cases of *intra-cranial inflammation, following purulent otitis media, with mastoiditis*. These cases demonstrate the danger of an extension of an inflammatory process from the external surface of the temporal bone causing an involvement of the intra-cranial structures. The course of such a process is marked, at first, by more or less necrosis from

subperiosteal abscess. The bone beneath dies, forms a sequestrum, and the process extends to the dura.

The first case described occurred in a child 10 months old. Pus found its way through the temporal bone, by the suture between the mastoid and squamous processes. An extensive necrosis resulted, involving the dura. A probe could be passed into this area to the depth of two and one-half inches. The other case occurred in an adult, whose mastoid cells were sclerosed. In this case, a haemorrhagic pachymeningitis involved the entire right side of the brain. The inflammatory process had reached the intracranial structures, as a result of the passage of pus, dissecting up the periosteum of the external auditory meatus, entering the temporal fossa, burrowing beneath the periosteum, and denuding the squamous and mastoid portions of the temporal bone. At this stage of the process, inflammation of the dura was developed. This patient's temperature was normal throughout the entire course of his illness, except on one occasion, when it arose to 100.5° F. (38.1° C.). Both cases show that subperiosteal abscess of the mastoid region may cause grave results, even when a free channel is established from the middle ear to the outer surface of the mastoid.

A. Marmaduke Sheild, of London,⁶⁶ has met with a case of *sinus thrombosis attended with remarkable ocular symptoms*. The patient, a man 35 years old, had suffered for a long period from purulent inflammation of the right middle ear. When the patient presented himself for treatment, symptoms of pyæmia were manifested; ptosis had developed, first on the right, then on the left, side. An extraordinary condition of exophthalmos was a striking feature; the left pupil was dilated and fixed, and showed no reaction to light. There was evidence of optic neuritis; no strabismus. A thrombosed vein was to be seen at the "root" of the nose. There was no œdema or tenderness over the right mastoid, but fullness and tenderness over the upper part of the right internal jugular vein. The patient's intelligence seemed good. There were fits of mental confusion and delirium manifested occasionally. The temperature was of the pyæmic type.

Post-mortem.—Three small embolic abscesses, the size of peas, were found on the cerebral cortex, and a fourth in the right corpus striatum. The ophthalmic veins were filled with a firm

thrombus. The cavernous sinus and right petrosal sinus were filled with pus. Clots and pus were found in the right lateral sinus, and the adjacent bone was rough and infiltrated with pus, while the adjacent surface of the cerebellum and medulla was coated with purulent lymph. The superior longitudinal sinus was normal.

This rare case shows that early thrombosis of the cavernous sinus may give rise to curious and diverse ocular phenomena, the whole condition being dependent upon disease of the petrous or mastoid processes.

A case of acute basilar meningitis, causing death, is reported by Knapp, of New York.⁹⁹ The condition developed in a man whose mastoid cells had been opened on account of suspected mastoiditis, resulting from chronic otorrhœa. The cells were sclerosed and the bone was perfectly healthy. At the post-mortem, the basilar meningitis was discovered, together with pulmonary tuberculosis. No symptoms had been presented suggestive of pulmonary disease, but the indications had pointed to cranial suppuration following aural disease.

Note is made of a case of *primary mastoiditis*, by Leartus Connor, of Detroit.⁴⁵¹ This very rare condition developed in a child 10 years of age. The drum-head was normal in lustre, and hearing was good. There had been frequent attacks of pain in the right side of the head, and a swelling appeared over the right mastoid process. This was incised, and denuded bone found. The mastoid cells were then opened and were found to be filled with pus. Treatment, consisting in antisepsis and quinia, resulted in recovery. During the entire course of the illness, there was no involvement of the inner or middle ear.

Mastoid Abscess Breaking into the Digastric Fossa.—B. Alexander Randall, of Philadelphia,⁸⁰ in a clinical lecture on this subject, reports three cases in which pus found this outlet from the mastoid cells. In one case the inner surface of the cells toward the digastric fossa was largely destroyed; the pus-cavity there present was as large as a plum, and extended down and in upon the carotid and jugular. In a second case the abscess-cavity was as large as a hen's egg, and was found within and below the tip of the mastoid, where a probe could be inserted for more than three inches, reaching to the sheaths of the great vessels; irrigation passed out freely by way of the auditory canal. In the third

case, which presented the usual external symptoms of mastoiditis with swelling over the corresponding side of the neck, pus was reached through the fibres of the sterno-cleido-mastoid muscle, and a sinus was found on the digastric surface of the mastoid process.

All these cases progressed to a satisfactory termination, under a treatment of free drainage and antiseptic washes and dressings.

Mastoid Disease Following an Operation for the Removal of Adenoid Vegetations.—A case is reported⁹⁹ in which the patient, a woman 30 years old, had undergone an operation for the removal of enlarged adenoids in the naso-pharynx. At the time of operation she was suffering from acute pharyngitis. Removal of the growth was effected by evulsion by the surgeon's finger, and, on the day following, was completed by the use of forceps. Two days later purulent otitis media developed, and eight days later mastoiditis. The patient eventually recovered. The author has never known this complication to follow an adenoid operation, and believes that the aural inflammation may have resulted from the use of the carbolic-acid solution, which was syringed through the nares as an antiseptic wash, after the operation.

Sixteen cases of purulent mastoiditis, with fifteen operations and recovery in every case, are detailed in a report by E. S. Clark, of San Francisco.¹⁰⁰ Two of these cases were in a semi-delirious condition when operated upon, and could not possibly have survived a delay of twenty-four hours. The average duration of the middle-ear affection, in the fifteen cases of operation, was about five weeks. Otorrhœa ceased, after a few days, in eleven cases; it continues now in one patient only, a case of twenty years' standing. In all but four cases communication was gained with the middle ear, the fistulae giving passage for antiseptic washes. Except in two cases, such fistulae closed in from one to four days. The external wound closed in from one to four months, except in the first case, which remained open fifteen months, and the last two cases still under treatment. Affection of the bone resulted from chronic otorrhœa in two cases, from acute relapse of chronic otorrhœa in three, and from the acute form in the remaining eleven cases. Schwartz's chisels were employed for opening the pus-cavities, found usually at a depth of one to ten millimetres. The cavities were then smoothed out with scoops, followed by dressings of carbolic acid, sublimate, or iodoform.

Antiseptic washes were used daily, and, as the external wound closed, a conical-shaped leaden nail was inserted, which was reduced in size gradually until the opening closed entirely.

Two cases of Bezold's perforation of the mastoid antrum form the subject of a paper by Guye, of Amsterdam.⁸⁴⁴ This perforation, described by Bezold, occurs in the median wall of the mastoid process, the pus working its way from thence down through the deep tissues of the neck or into the post-pharyngeal space.

Case I. Man, aged 50 years; otorrhœa, lasting eleven weeks; periosteal swelling, twice incised by Wilde's cut, without any escape of pus; swelling of throat and in the retro-maxillary fossa; great pain in the ear and development of facial paralysis; perforation of the drum-head; granulations in external auditory canal; closure of the Eustachian tube. After applying poultices to the neck, fluctuation was observed at the anterior border of the sternocleido-mastoid muscle. On incising this area, much pus escaped. A drainage-tube was inserted, and solutions syringed into this tube ran out from the auditory canal. The patient recovered.

Case II. Man, aged 65 years; had otorrhœa for six months; mastoiditis developed and the mastoid process was opened by chiseling; much pus escaped. Two weeks later a swelling appeared in the neck, below the mastoid process. Shortly after this a swelling developed in the posterior wall of the pharynx, which proved to be a retropharyngeal abscess. This was opened, free drainage through the parts involved was maintained, and the patient recovered completely.

As to treatment, the author recommends that an opening, sufficiently large for drainage, should be made into the antrum. It is best, then, to wait until indications show where and when a counter-opening should be made.

Arno Scheibe, of Munich,⁸⁴⁴ treats of *the cause of inflammation of the mastoid in acute otitis media, especially the importance of the diplococcus pneumoniae in this process*. In 16 cases of mastoiditis, resulting from simple acute otitis media, the diplococcus pneumoniae appeared in 9, the streptococcus pyogenes in 5 (once with the staphylococcus albus), the staphylococcus in 1, and a coccus of uncertain classification in 1 case. It was made evident, by the examination, that different micro-organisms are capable of exciting this complication. In uncomplicated cases of

otitis media, the streptococcus pyogenes, and next in frequency the staphylococcus, is most commonly present.

Regarding the diplococcus pneumoniae, in 13 cases of uncomplicated otitis media it appeared in 2 cases, or 15 per cent.; while in 16 cases of mastoiditis it was found in 9 cases, or 56 per cent. It is apparent, from this series of cases, that the diplococcus pneumoniae is the peculiar organism which is found most frequently in cases of mastoid involvement complicating simple otitis media.

In 6 cases of Bezold's form of mastoiditis, forming a part of the 16 cases of the series, the diplococcus, streptococcus, and staphylococcus were all found, and in two cases where lymphadenitis existed the diplococcus was present.

Opening of the Mastoid in Acute Middle-Ear Inflammation Following Influenza.—Adam Politzer, of Vienna,³⁷ states that mastoiditis is a most frequent complication of otitis due to influenza. The main points of difference between the mastoid inflammation of simple otitis and that caused by *la grippe* are in the rapidity of involvement to be noted in the latter case and the destructive course of the disease. In a case detailed, death occurred at the end of about two and a half months after the primary attack, and at the post-mortem examination an abscess with hard, thickened wall was found in the temporal lobe. Back of this large abscess another one was found, quite small, but not communicating with the larger one.

Treatment must be prompt and energetic: paracentesis of the drum-head, as soon as the presence of effusion is indicated; cold applications over the mastoid process, and operative measures for the removal of pus, as soon as its presence in the cells is manifested.

Alexander Black³⁸ advocates *the use of drills, run by the dental engine, for opening the mastoid cells.* This procedure is a suggestion of Hunter Mackenzie. The method consists in the employment of a gimlet with a small point. For children, the point is about one-sixth of an inch. This instrument is to be screwed carefully, by hand, into the bare bone, until the cavity within the mastoid is reached. A cone-shaped burr is then used to enlarge this opening. When sufficiently large, and free drainage has been established through the external auditory canal, a metal wire, twisted in a close spiral, is inserted into the bone, and kept until the discharge has almost disappeared. The patients thus operated

upon all suffered from chronic purulent otitis, with mastoiditis. In none of these cases was there any rise of temperature or bad result after the operation.

Oren Pomeroy, of New York, ⁹⁹ _{Sept. 15} reports *seven cases of extensive caries of the temporal bone following mastoiditis*. Treatment consisted in antisepsis, drainage, and tonics, while only loose or readily-detachable bone was taken away. It is a matter of surprise that only one of these cases resulted fatally, when it is known that a considerable quantity of dead bone, in the vicinity of the brain, may induce fatal cerebral diseases. The author did not remove any dead bone which encroached upon the meninges.

Trepanning the Antrum in Children.—Laurent ¹⁸⁶ _{July 15} has devised a drill for making an opening into the antrum through the external auditory canal. The trephine consists of a hollow shank, with cutting end. Attached to it is a cannula, to which a plate is fastened, regulating the depth to which the instrument can penetrate. The cutting point is applied to the antero-superior (postero-superior ?) angle of the bony part of the auditory canal. By means of a handle, the drill is turned backward and inward to the desired depth. Pus can escape by the cannula, or aspiration or antiseptic washes used through the same.

Another method of reaching an opening in the antrum is that of Stacke. ³³⁶ _{April 25} His plan of procedure is to draw the auricle forward, after detaching it along its posterior border; then, to detach the cartilaginous auditory canal from the bony canal, and, next, lay open the posterior wall of the bony canal and the antrum into one cavity. Granulations and necrotic tissue are to be removed, and the resulting hollow is to be covered with a skin and periosteal flap from the external auditory meatus. A healthy epidermis covering for the osseous cavity is thus produced, and a permanent opening is formed between the antrum and the meatus. The duration of treatment is, on an average, about four months. Thirty-three cases have been so treated, resulting in 19 cases of healing, 2 cases placed under a different plan of treatment, 2 which have disappeared, 9 still undergoing the treatment, and 1 death. In this latter case, the cause of death was diabetes mellitus. The hearing power has never been made worse by this method, but is generally unchanged. In a few instances it has improved.

Wound of the Lateral Sinus in the Course of a Mastoid Operation.—St. John Roosa, of New York,⁶¹ adds another case, to those already reported, in which this accident occurred without very serious result. It was that of a lady 33 years old. The mastoid was opened by drilling. The drill passed through the bone, and at once entered a large cavity. Upon removal of the instrument a gush of venous blood followed, which could not be checked by ordinary means. The wound was plugged with iodoform gauze, which was left untouched for four days. There was no more haemorrhage, but symptoms of septicæmia developed. After two months of expectant treatment, the patient made a complete recovery.

Use of a Guide in Opening the Antrum.—Albert Buck, of New York,⁵⁹ recommends the use of a guide in following down the postero-superior wall of the bony auditory canal, when attempting to open the antrum. The curved, sharp end of a hook (Fig. 1) is introduced from above into the orifice of the auditory canal, between the soft parts and the upper part of the bony orifice. The long axis of the instrument should correspond with the long axis of the patient's body. The way to the antrum is thus marked out plainly, and does not have to be probed for at intervals, nor is it lost or obscured by blood. Fig. 2 is a large fenestrated retractor for mastoid operations. By its aid the flap, composed of the auricle and surrounding soft parts, can be drawn well forward, thus increasing to the fullest extent the area of exposed bone surface.

Pyoktanin in Deep, Secondary Mastoiditis.—Ellis, of Los Angeles,⁴¹ obtained excellent results from a 1-300 solution of pyoktanin, as a cleansing agent for necrosed bone in the mastoid cell. The solution seemed to be more efficacious than hydrogen peroxide.

Tuberculosis of the Labyrinth.—Ernest Cohnstadt, of Erfurt,^{385 286} May; Sept. Oct. reports this condition in a child, 11 years of age, who suffered from mastoid abscess and otorrhœa, right side. The right drum-head and ossicles were completely destroyed, and the hearing tests indicated disease of the labyrinth. Koch's bacillus was found in the pus. There had been absence of mastoid symptoms, but, in spite of this fact, the author opened the mastoid antrum and found there much liquid and cheesy pus; also, granulations. A few days later, the child died from meningitis. The autopsy re-

vealed osteitis of the petrous bone, with much granulation tissue and cheesy matter; total destruction of the various parts of the inner ear; suppurative basal meningitis, and abscess of the right hemisphere of the cerebellum. The author states that it is his custom to make bacteriological examination of the pus in all cases of chronic otorrhœa, and that he always finds Koch's bacillus among scrofulous patients. He points to the rapidity with which this inflammatory process involves the bone, especially the mastoid cells, without manifesting the decided symptoms of mastoiditis.



FIG. 1.—MASTOID HOOK-GUIDE. (Reduced one-half in size.)
(*Medical Record.*)

He does not delay trepanation until the development of such symptoms. He has always, in these conditions, found the mastoid cells invaded by tuberculosis.

B. Alexander Randall, of Philadelphia,⁶¹ reports thirty-two cases of trephining for mastoid abscess, among three thousand four hundred aural patients. His experiences lead him to conclude

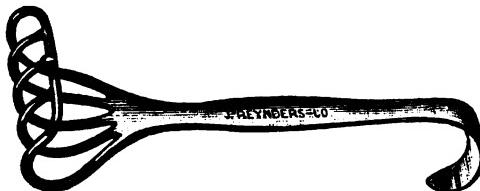


FIG. 2.—LARGE FENESTRATED RETRACTOR FOR MASTOID OPERATIONS.
(Reduced one-half in size.)
(*Medical Record.*)

that, although operative procedures may not be necessary, unless the presence of pus is evident, this must be thoroughly evacuated, when present, and its tendency to burrow considered and guarded against. A general anaesthetic is essential for the proper performance of an operation, so as to facilitate thorough exploration and to enable the surgeon to operate promptly to any extent which the nature of the case is found to require. The aim of an operation must be more than the mere securing of drainage; but, as the nature of any case—owing to the wide range of variations in

the anatomy and pathology of the area involved—cannot be learned except by most cautious study by sight, finger, and probe, the radical removal of all suspected tissue must be effected, if the progress of disease is to be arrested with certainty. In the after-treatment, the minimum of interference is desirable, the ample external wound being closed by sutures, with little packing, and all subsequent irrigations are to be regarded as undesirable, and to be avoided as far as possible.

The duration of after-treatment is in exactly inverse proportion to the thoroughness and success of the primary operation.

MISCELLANEOUS.

The Organs of Hearing and Life-Insurance.—Lawrence Turnbull and S. W. Steinbach, of Philadelphia,¹⁹ in an article upon this subject, consider the questions to be solved by aural examination, in this connection, to be: 1. Is the life of the individual endangered by the condition of his organs of hearing, and, if so, to what degree? 2. Has the ear affection any connection with other general and local affections? 3. What injurious influence may the aural affection have upon the individual's ability to follow his vocation, or would it invalidate the policies?

The examiner must guard against the applicant's statement of his aural trouble, as such affections are apt to be concealed or underrated. The examiner should look for enlarged lymphatics in the maxilla-mastoid fossa and at the mastoid process; fistulous tracts in this region; ulcerated surfaces here and on pinna, often indicative of carcinoma; foreign masses within the ear, sometimes marking the presence of cholesteatomata or disease of the middle ear; swellings of the auditory canal, and polypi; perforations of the drum-head, when associated with constant or intermittent otorrhœa. As for labyrinthine symptoms, it is stated that "life is seldom endangered by primary affections of the labyrinth," but dangerous cerebral disease may be thus indicated. Facial paralysis should be guarded against especially, as having a possible origin in disease of the seventh pair of nerves, from diseased bone within the ear. Evidence of mastoid disease must also be looked for. Individuals requiring especial attention are such as have a thin, serous discharge from the ears, an occasional complication of the early stages of tuberculosis.

DISEASES OF THE NOSE AND ACCESSORY CAVITIES.

By CHARLES E. SAJOUS, M.D.,
PARIS.

Physiology and Histology.—Cornil, of Paris,⁷⁵¹ reported the results obtained in a study of the olfactory bulb, after the methods of Golgi. An impression transmitted from the olfactory nerve to the bulb takes the most direct channel, following the prolongations of the cells of the gray substances, and their cylindro-axial prolongations likewise. The impression also utilizes numerous collateral channels which are created, thanks to the numerous inter-communications existing between the cellular elements.

Kölliker, of Würzburg,⁸, has studied the minute structure of the olfactory bulb. He describes certain glomeruli, which he calls “glomeruli olfactorii,” one millimetre in circumference, from which originate, according to Golgi, Ramor, von Gehuchten, and himself, the filaments of the olfactory nerve. In them, also, are the terminations of the neighboring protoplasmic cells. They also contain neuroglia, and are surrounded by vessels. As regards the relation of the nerve-fibres with the cellular prolongations in the glomeruli, Kölliker thinks that they assist in the propagation of the nervous current, and that sometimes the action of one nerve-fibre upon the other may be exercised without the intervention of the ganglionic cells.

A. von Brunn²⁹ endeavored to elucidate the following points, his researches being made upon the heads of decapitated men: Is there a typical olfactory epithelium, and where can it be found? What are its relations with the olfactory fibres? What is the difference in the structure of the respiratory region and the olfactory region? His conclusions were that the olfactory epithelium is found exclusively in the superior turbinated bone, especially in its middle portion, the space which it occupies being scarcely five hundred millimetres square. The nerve-fibres end where the olfactory fibres begin, the thickness of the latter being about 0.06

millimetres. As to the relation of these fibres with the cells, the author confirms the previous researches of Ehrlich, Arnstein, etc. As Ramon y Cajal has already shown, the divisions of the olfactory fibrillæ cannot be recognized. In the respiratory tract of the pituitary, a basal membrane is found, which is confined to the purely olfactory region. This latter region is, besides, very poor in connective tissue, which is abundant in the respiratory region.

Von Brunn,² also showed a preparation, after the method of Golgi, of the organ of Jacobson in the sheep, in which could be plainly seen the prolongations of the central olfactory cells, completely joined to the nervous olfactory fibres.

Etiology of Affections of the Upper Respiratory Tract.—Macintyre,¹¹ presented a most valuable paper upon this subject, at the meeting of the British Laryngological and Rhinological Association, the etiological factors considered being the micro-organisms peculiar to the regions studied, in health and disease. The author's purpose is to point out the difficulties attending such investigations and the overwhelming nature of the work in attempting to gain an idea of the organisms found, and to emphasize the importance of antiseptic precautions during treatment of the cavities. Inasmuch as the upper respiratory tract is full of micro-organisms, non-pathogenic and pathogenic in nature, extreme care and cleanliness are insisted upon. The relation of disturbances of the mucous membrane of the upper air-passages to constitutional conditions is aptly reviewed by Beverly Robinson, of New York.¹ Although no new facts are presented, the article is entitled to careful reading.

O. B. Douglass, of New York, ⁵⁰ ascribes to "points of contact" many of the troublesome manifestations of nasal disorder. At these points of contact secretions are retained, and they form foci of considerable local trouble. Their most common situation is between the middle turbinated body and the septum. Sufficient tissue should be removed to prevent the unusual approximation between the two surfaces.

Ocular Affections, or Sequelæ of Nasal Diseases.—Ziem, of Dantzig, ³⁴ ³⁷, published interesting cases in which intra-ocular symptoms had supervened on nasal disease. In one of these the part played by nasal obstruction in the aggravation of the ocular

disorder is clearly defined. "A man 68 years old was suffering from a tumor which obstructed the nose on both sides, especially the left. An irregular excrescence was felt in the left half of the nose, and the left half of the naso-pharyngeal cavity was almost filled by a similar tumor of irregular shape. The left eyelid was tumid and hanging down, as if paralyzed. The eyeball protruded downward and was only very slightly movable. The conjunctiva was injected, the pupil dilated and fixed, and partial amaurosis was present in the right eye, with venous hyperæmia of the retina and considerable shortening of the focus. The patient, who suffered severe pains in the left eye, begged for its removal, but no operation could have been of any benefit. Injections into the nose helped to remove a large quantity of badly-smelling pus and gave the patient great relief, and continued treatment also restored the focus almost to its normal length. In about ten weeks the patient died from the progress of the malignant tumor. The success of the treatment made it plain that the case was not one of retrobulbar neuritis, but that the interior of the eye became congested through the swelling of the nasal mucous membrane. In the words of Ziem, the restoration of normal nasal respiration and increase of the respiratory capacity of the lungs re-establish free circulation in the vascular system of the nose and neighboring organs, as well as in the rest of the body; so that after the depletion of the orbits, the eyeball, and ciliary bodies, the current of blood becomes normal again within the retina and the ophthalmic nerve, and restores the function of these organs." A general review of the relation between ocular affections and those of the nose and its accessory cavities is given by E. Berger, of Paris.²⁴

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The influence sometimes exerted by nasal disorders upon ocular ones is also interestingly shown in a case reported by A. B. Kibbe, of Seattle, Wash.⁵⁰ The patient, a man aged 33 years, presented no evidence of hysteria. He stated that for nearly a year he had been unable to read or use his eyes for other close work without a sense of weariness, and that he had been a sufferer from almost constant headache in the temporal region, on both sides, for a period of five years. Examination showed emmetropia, all glasses being rejected. Four days' use of atropia, $\frac{1}{2}$ -per-cent. solution, showed Hm. .50 O. S. and D. These glasses were pre-

scribed for constant use simply as an experiment. Five months later he called to say that his eyes were no better, though he thought the glasses had been of some slight assistance in reading. He had spent the summer in the mountains with the hope that the out-door life might benefit him, but had returned disappointed. Testing with prisms revealed insufficiency (3°) of the external recti. The nasal passages showed a deviation of the septum to the right side, and an enormous hypertrophy of the left middle turbinate bone, completely filling up the concavity in the deviated septum. The overlying mucous membrane was intensely red, and a 10-per-cent. cocaine solution failed to appreciably diminish either the injection or the size of the tumor. The muscular insufficiency was, in itself, sufficient to account for all his symptoms, but, with the condition of the nasal passages added, an exact diagnosis was impossible. One and one-half degree prisms, base out, were worn with no difficulty.

At the end of two weeks, no improvement being reported, removal of the hypertrophied turbinate was proposed, to be followed, if found necessary, by a graduated tenotomy of the internal recti. To this he assented. The mass removed was about ten millimetres long, eight wide, and eleven thick. Bleeding was rather copious, but soon stopped spontaneously. The following day he returned, saying that he could read without difficulty, and that his headache had nearly ceased. At the expiration of a week his headaches had entirely ceased, and he is now able to read indefinitely without pain or annoyance of any kind.

An examination made eighteen months later showed the insufficiency of the externi to have disappeared. Prisms of 8 degrees, base in, are overcome, and in the vertical diplopia test the images are superimposed. This is the most peculiar feature of the case. Why the turbinated hypertrophy should have produced an innervation of the external recti is difficult of explanation; and the question arises, Is it not possible that some cases rebellious to prisms, tenotomies, and every known method of treating asthenopia may have a source similar to the one reported?

Obstructive diseases of the lachrymal passages and the associated intra-nasal lesions were studied by de Schweinitz, of Philadelphia.⁷⁶⁰ He considers as originating in chronic or subacute post-nasal catarrh a large class of cases characterized chiefly by epiphora

without catarrhal or purulent secretion, in which the obstruction in the lachrymo-nasal duct depends upon swelling of its mucous membrane, and not upon true stricture. In many cases the obstruction takes the following course: First, a chronic pharyngitis occurs; later, hypertrophy and inflammation of the intra-nasal mucous membrane, followed by swelling of the lining tissue of the lachrymal duct. Gradually cicatricial changes arise, and a true stricture is formed. The drainage of the conjunctival *cul-de-sac* ceases; the micrococci natural to the part, and those which readily find access to this region, permeate the contents of the lachrymal sac, because this can no longer be emptied; the pathogenic micro-organisms exercise their true function, and suppuration occurs. A number of cases develop, chiefly in old people, in which there is epiphora, again without the presence of pus or muco-pus, depending upon obstruction in the lachrymal duct from atrophic changes, the whole being part of a similar atrophic process in the intra-nasal passages, and generally described under the term "atrophic catarrh." The obstruction, in these instances, is not from swelling,—not from stricture, but from contraction. A very common cause of an exacerbation of lachrymal disease is due to the pressure of a hypertrophic turbinate body, or similar intra-nasal obstruction, which under treatment has gradually subsided, but which, owing to exposure, swells up again and exercises its obstructing influence. At once there is occlusion of the lachrymal passages with recrudescence of the symptoms.

Finally, there is a class of cases in which there exists an obstruction at the intra-nasal end of the duct (it may be trivial), permeable by the fluids used in a syringe, but an impassable barrier to the outflow of tears. Even the slightest obstructions, under these circumstances, may defeat the most classical treatment of lachrymal disease.

Aural Affections as Sequelæ of Nasal Disorders.—R. E. Swinburne, of New York,⁵⁹ contributed a valuable paper on the relations of aural and nasal affections. The evidence produced is based upon no less than 1000 cases of otitis media in which the pathological condition observed in the anterior nares and the nasopharyngeal space was treated with all the care exercised in the treatment of the aural trouble proper. The ear diseases were as follow:—

Acute catarrhal otitis,	64
Subacute catarrhal otitis,	99
Chronic catarrhal otitis,	440— 603
Acute purulent otitis media,	136
Chronic purulent otitis media,	290
Chronic purulent otitis media with aural polypi,	31— 397
Total,	<u>1000</u>

The naso-pharyngeal affections accompanying or causing these were:—

Acute rhinitis,	84
Subacute rhinitis,	33
Chronic rhinitis,	374
Hypertrophic rhinitis,	253
Atrophic rhinitis,	27— 771
Adenoid vegetations,	27
Hypertrophied tonsils,	27
Hypertrophied tonsils and adenoid vegetations,	5
Nasal polypi,	8
Deformed nasal septi,	76— 143
Scarlet fever,	23
Measles,	11
Diphtheria,	3— 37
Sea-bathing,	2
Unaccounted for,	47
Total,	<u>1000</u>

As shown in the above list, 95 per cent. of the cases presented pathological conditions of the nasal and pharyngeal membranes. Of these, 77 per cent. were of the various forms of rhinitis, 14.3 per cent. had deviations of the septum, polypi, vegetation, and enlarged tonsils, and 3.7 per cent. could be attributed to the throat complications of the exanthemata, leaving a balance of 4.7 per cent. in which the cause was not accounted for by the records. Some of these, however, were in children too young to permit of a satisfactory rhinoscopic examination, and the aural symptoms had existed so long that the parents could not remember whether or not they had been preceded or accompanied in their acute stages by nasal troubles; it is, however, probable that the origin of some of these would have been satisfactorily explained had it been possible to obtain their early histories.

Bendelack-Hewetson, of Leeds,¹¹ in a paper on the relations between the various forms of nasal stenosis and deafness, ascribed the former condition to a devolutionary process going on in the bones of the face, probably due to the fact that civilized men par-

took habitually of a much softer food than that which fell to the lot of savage men. The natural resultant was an alteration of the bones of the face as a whole, leading to narrowness of the jaws, crowding of teeth, elevation of the palate, etc. In the course of the discussion which took place at the meeting of the British Laryngological Association, before which the paper was read, Stoker pointed to the fact that savage races ate meat in quantities, Indian corn, etc., and that the difference between their articles of food and our own was not sufficient to account for the absence or presence of nasal stenosis. Their out-door and more natural mode of living was, according to Collier, more to be considered as the basis of the rarity of deviations of the septum in particular, this rarity having been demonstrated by him in several thousand observations among aborigines. Bendelack-Hewetson showed an instrument resembling a glove-stretcher, which he employed to cure his cases of nasal stenosis. He first dilated the nostril, "using all his force to open properly." "It crushed back the wall of the antrum," after which celluloid tubes are worn for seven or eight days to prevent recontraction. "If the turbinated bones were enlarged, he always removed them before dilating, because he did not wish to complicate the operation." (!)

Complications following Nasal Operations.—Wagner, of Halle,³⁴ reports a case of meningitis occurring as a result of cauterization of the middle turbinated body. The galvano-cautery had been applied to the anterior part of the lower border of the left middle turbinate bone. Three days after there was a venous haemorrhage from the posterior nares and headache. The bleeding was eventually stopped by plugging. The temperature then went up to 40° C. (104° F.), the pains continued, Cheyne-Stokes respiration supervened, with stiffness of, and pain in, the neck, followed by pains in the joints. Death occurred, with meningitic symptoms, thirteen days after operation. No autopsy was performed. The author concludes that the bleeding could not have been the direct consequence of the operation, the spot from which the blood came not being that operated upon. He believes that thrombosis of a sinus occurred, which disturbed the nasal circulation. Consecutive disorders of the ears following relatively simple operations in the nasal cavities are reported in nine cases by Hessler, of Halle.³⁴

Acute Rhinitis.—Tissier, of Paris,²⁷ calls attention to the fact that the acute coryza occurring so frequently as an early symptom of influenza forms the starting-point of many cases of otitis. In others it is the early stage of purulent rhinitis, tending greatly to increase the depressing effects of the disease. A careful treatment of the nose should, therefore, be instituted early in the course of the affections. Warm borated solutions are recommended.

One part of soziodol to seven parts of powdered talc, used as snuff once a day, is recommended by W. Myers, of Seguin, Texas.¹²¹ M. D. Lederman, of New York, advocates a solution of cocaine and menthol, 20 grains (1.3 grammes) each, dissolved in benzoinol, 2 ounces (60 grammes), applied after cleansing the cavities with an antiseptic solution. In a case of unilateral coryza, Hornung, of Vienna,³ ascribing the cause to functional alteration of the great sympathetic, employed nervines as the basis of his treatment, and obtained satisfactory and prompt results.

Fibrinous Rhinitis.—Sedziak, of Warsaw,³¹² basing his opinion upon a case seen in the hands of a colleague, and upon an exhaustive study of the literature of the subject, considers that fibrinous rhinitis as an independent pathological process, and as a disease *sui generis*, having nothing in common with diphtheria, does unquestionably exist. In connection with a recent case seen by him,¹¹ characterized by no fetid discharge, Sedziak made bacteriological examinations. He was unable to find the Klebs-Löffler bacillus in the membranes, or in preparations on glass, or in sections colored by the usual Löffler method (methylene blue and rose), but, by the special method of Weigert, found fibrin, lymphoid cells, and a few cocci. On agar-agar, at the temperature of 37° C. (98½° F.), the cultures obtained resembled the streptococcus pyogenes. Under the microscope were seen, under immersion and colored by gentian-violet, different kinds of cocci. Owing to a dearth of guinea-pigs, some of the sterilized membrane from the patient was inoculated into the back of a rabbit. A slight rise of temperature was the only evidence presented. No paralysis occurred; the wound completely healed. In support of the view that the case was one of fibrinous rhinitis, there is the clinical picture of the disease: slight and fleeting general disturb-

ance, absence of adenitis, typical membranes, want of collateral symptoms, etc.

Lieven, of Würzburg, according to M. Herzog, ⁵³ Nov. 14, '91; ³⁴ Dec. 1, '91 has been studying the character of this affection, both from a clinical and bacteriological stand-point. He distinguishes two forms of rhinitis fibrinosa: one presenting itself primarily in the form of a simple chronic catarrh which, later on, progresses to show the fibrinous exudations characteristic of the affection under discussion, and another which always makes its appearance consequent upon cauterization, either by chemicals or by the galvano-cautery. The latter form always appears some time after the cauterization crusts have fallen off. The observer also noticed that the formation of pseudo-membranes may extend beyond the nasal cavities to the face in cases in which an eczema narium had previously spread to the lips, sides of the nose, etc. [The first experiments in which micro-organisms were discovered in the pseudomembranes of rhinitis fibrinosa were made with false membranes taken from the nose of an adult patient, in whom the affection had developed after cauterization.] The membrane taken from the nose was washed externally in a 1-to-1000 solution of corrosive sublimate, and particles of the membrane so prepared were teased and cultivated on agar and gelatin. The cultures which developed showed only one species of staphylococcus, the colonies of which, as a whole, under a low magnifying power, were very similar to the colonies of staphylococcus pyogenes aureus. They developed, however, fully at the body temperature in twenty-four hours (in two to three days at the temperature of the room) equally well on agar and gelatin, and very poorly on potatoes. They liquefied the gelatin. In contradistinction to the yellow pus-producer, Lieven's staphylococci die out after six or seven weeks, and lose in two to three weeks their infectiousness against man. Guinea-pigs, rabbits, and house-mice, all of which can be infected by the staphylococcus pyogenes aureus, were entirely refractory against the action of Lieven's staphylococcus, even if injected subcutaneously or intra-venously. The following experiments were then made on human beings: In one case a tampon saturated with a culture of the staphylococcus of rhinitis fibrinosa was applied to the nasal cavity of a healthy individual. The result was negative. So were other experiments on individuals, in which a hyperæmic

condition of the nasal mucous membrane had been produced by large doses of iodide of potassium. In three cases a typical rhinitis fibrinosa was produced in persons who had been cauterized, after the crusts had fallen off and after staphylococci tampons had been introduced into the nose and been kept there for ten to twenty minutes. All experiments in children with acute simple rhinitis furnished positive results.

While these experiments were conducted at the clinic, cases in which cauterization in the nasal cavities had been performed spontaneously developed fibrinous rhinitis, proving also the infectiousness of the disease, which had been denied by its early describers. After removal of the false membranes in those cases produced artificially by the insertion of culture tampons, sections were made from these fibrinous exudates. They showed the staphylococci exactly in the same distribution as they had been observed previously in preparations derived from spontaneous cases. No other micro-organisms were found in any of the sections. Cultures from the false membranes produced artificially showed the same characteristics as those derived from natural sources. The cases were treated by removal of the membranes and insufflation of cresol-iodide (europhen).

Caseous Rhinitis.—L. Concetti, of Rome,⁴¹ reported in 1886 a case, in a child 5 years of age, in which the patient became the focus of infection for diphtheria, three other children and a servant in the same family having taken the latter disease, whose virulence was demonstrated by the death of the youngest of the patients. In July, 1891, the author saw another case of the disease, which he calls "chronic diphtheritic rhinitis," and which lasted about three months. Bacteriological researches were negative the first time; a few days later the examination was repeated, and a culture of the Löffler bacillus was obtained. The bacillus was isolated and inoculated into two animals. Death rapidly ensued. He recommends that a careful bacteriological examination be made in every case to determine the nature of the false membrane present.

Stamm, of Berlin,¹⁵⁸ also examined, for bacteria, the false membrane occurring as a product of this disease; but, unlike Maggiora and Gradenigo and Lieven,⁵⁰ who had examined cases following cauterization of the Schneiderian membrane, he

utilized three cases in which no traumatic origin could be traced. In one case there was no exciting cause; in the two others the disease followed rubeola. Although all three progressed satisfactorily, the bacillus of Löffler was found in each case. Twelve hours after inoculation of the serum numerous typical colonies were developed, and experiments on animals with these colonies demonstrated that he was by no means dealing with pseudodiphtheritic bacilli. Stamm therefore concludes that, unless the cases originate in cauterizations, they must be considered as diphtheritic in nature. Cases are reported by C. E. Perkins, of Sandusky, Ohio,^{19 July 16}; F. A. Nyulasy, of Melbourne^{285 July 16}; and Middlemass Hunt, of London.^{11 Dec. 11}

Hypertrophic Rhinitis.—F. Whiting, of New York,^{1 Dec. 12, 91} condemns the usual surgical and chemical procedures in the treatment of hypertrophied turbinate bones, owing to the wholesale sacrifice of mucous membrane they involve. He recommends a flap operation, in which he removes, by means of the electric drill, the lower edge of the middle turbinate bone, leaving the portion of membrane nearest the septum intact. The most dependent portion of the mucous membrane and a thin shell of bone are thus carried away along the entire length of the turbinate, leaving a curtain-like flap hanging from the remaining osseous projection, which flap, curled under the edge of the latter, is said to heal in place by first intention, under antiseptic precautions. The advantages alleged for the operation are: 1. That the minimum amount of traumatism is inflicted upon the nose; very slight in comparison with that of other operative measures. 2. That, in consequence of the use of a flap, union by first intention is obtained and the formation of dense masses of scar-tissue avoided. 3. That by this method there is complete preservation of that most essential structure of the nose,—the mucous membrane. I cannot understand the latter conclusion, and much less the onslaught on the usual operations, which, with the exception of total removal, involve the sacrifice of less mucous membrane than seems inevitable in the author's procedure. When true hypertrophy exists, the excess of tissue, including its superficial layers, epithelium, etc., must be reduced to obtain satisfactory and permanent results. These are, doubtless, reached in Whiting's operation, but rather through the vigorous destruction of *excessive* elements than

through the economy of them, which he claims. The bleeding is said to be usually inconsiderable.

Bresgen²² advocates the employment, after each galvano-cautery application, of a 20-per-cent. solution of chromic acid applied to the same spot, and recommends the aniline colors for the after-treatment. To reduce hypertrophies of the posterior extremity of the inferior turbinated body, he introduces the galvano-cautery point deeply into the tissues, leaving it *in situ* during a few moments. Flatau²⁴ strongly recommends electrolysis. By carefully regulating the current employed he obtained satisfactory results with this method, with a relatively small destruction of the surface and of the serous and mucous glands. He has found it in no way inferior to the more heroic methods of treatment hitherto adopted. Electrolysis is also extolled by W. Scheppegrell, of New Orleans.¹²

Drawing in of the Alæ of the Nose.—Moritz Schmidt, of Frankfort-am-Main,^{29 451} considers the drawing in of the alæ nasi as one of the more frequent causes of mouth-breathing and its evil results. It may affect the whole ala, or only the outer border of the inner nasal opening,—the plica vestibuli. The cause is a laxity of the nasal walls and a deficient activity of the dilator and levator muscles. All processes which hinder nasal respiration and thus cause insufficient use of these muscles influence its appearance. This condition is always looked for by the author, and, if present, is treated by a small wire dilator,—the invention of Feldbausch. Swelling of the turbinated bodies has been cured by its means alone. The author has used it in more than one hundred cases. He also recommends its use in typhoid fever, pneumonia, and phthisis (especially laryngeal) when there is mouth-breathing.

Nasal Stenosis and Health.—Taking as his text that many forms of disease not obviously of nasal origin have been cured, relieved, or prevented by treatment directed against nasal stenosis, W. Spencer Watson, of London,^{6 10} believes that the evidence thus furnished is sufficiently well founded to form a trustworthy guide in treatment. He therefore contends that nasal obstruction, usually made light of, should be sought for; that is to say, considered as a possible etiological factor along with the others usually considered in a very large class of diseases in which, up to quite recently, its influence has been more or less ignored. Oppen-

heimer, of Berlin,⁴ states that in five cases of girls with irregular menstruation, which often ceased for some months, the author cauterized hypertrophies of the turbinate bodies. Some days after menstruation re-appeared and remained regular. The author believes that there was a relation between the two diseases.

Nasal Stenosis and the Singing Voice.—A. B. Thrasher, of Cincinnati,⁵³ enumerates, as follows, the ways in which the singing voice may be influenced by nasal obstruction : (1) by directly or indirectly hindering the movements of the soft palate; (2) by affecting the sound-waves in the naso-pharynx which re-inforce the primal laryngeal wave; (3) by causing mouth-breathing with the consequent impairment of the pharyngeal and laryngeal mucosa; (4) by exerting a reflex action either on the muscles of the larynx or palate.

Atrophic Rhinitis.—W. F. Chappell, ⁵⁹ _{Apr. 22; May} ⁵⁴⁷ after using europhen for six months, recommends it highly in ozæna. The nasal cavities are first carefully cleansed by means of a $\frac{1}{2}$ -per-cent. solution of creolin, and the parts are then covered with europhen,—a light-yellow, amorphous powder,—using an insufflator for the purpose. Daily treatment for four months was found necessary in the cases reported as cured. These cases usually improve under any well-directed treatment, but time alone can prove whether a cure has been accomplished.

Flatau⁸⁴ describes his treatment of the above affection in the following manner: The larger masses of secretion are loosened by means of a dull or small-pointed probe, and removed by forceps. The nose is then sprayed with a 10- to 15-per-cent. solution of peroxide of hydrogen, and the small, loosened crusts either blown out or taken out with forceps. The nasal cavity is then insufflated with iodol. The nasal cavity is then plugged with 10-per-cent. iodol gauze, which has been passed through a mixture of vaselin, lanolin, and paraffin. He covers the gauze with an ointment made as follows:—

R Sozoiodolate of zinc,	10 parts.
Vaseline,	
Lanolin,	aa 400 parts.—M.

The treatment should be practiced daily for from four to six weeks. Robertson, of Newcastle-on-Tyne,¹¹ finds that the mucosa of the
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antrum is more or less affected in all cases of ozæna. The antral disorder leads, first, to an impaired condition of the osseous walls and adjoining structures, teeth, and inferior turbinals; second, to stenosis of the natural opening of the antrum, and thus retention of exhalations and excretions from the antral mucosa; third, that the contents of the cavity may be fluid pus or inspissated white masses of curdy material lining the walls, and of an ozænatous odor, while bony outgrowths are sometimes found partitioning the space; fourth, that these conditions abolish the physiological function of the sinus, and react viciously on the intra-nasal structure and function; fifth, that opening the sinus by a large perforation in its anterior wall and clearing out its contents, curetting the mucosa, etc., at once stops crust-formation and fetid odor, and leads to an exhaustion of the ozænatous process.

In the case of recurrent nasal polypi, in the course of the disease the antral mucosa becomes affected and reacts on the intra-nasal condition, especially on the middle turbinal, thus perpetuating or propagating the intra-nasal conditions. Polypoid degeneration of the antral mucosa is met with along with distinct polypoid growths and partitioning septa in the space. The absence of pus does not contra-indicate an unsuccessful result from operation. In these cases of recurrent polypi, coincident lacunar disease of the middle turbinal is often found. No operation short of a perforation in the anterior wall capable of affording a complete digital or ocular examination of interior of cavity is of any service, while such a perforation affords a painless sinus and one facilitating a prolonged aération and douching of the sinus until the intra-nasal conditions, which are notoriously long in resolving themselves, are restored to their normal state.

The author in operating at first, some years ago, employed dentists' drills, but now employs the mallet and chisel. Where extensive operation is not securable, a little cocaine and an ordinary gimlet, to perforate the anterior wall, will answer readily, much more so and less painful than perforating the nasal wall of the sinus.

A. Bronner¹¹ finds trichloracetic acid more efficacious than most other remedies. He uses a 10- to 50-per-cent. solution in water, this being applied to the turbinated bodies and septum two or three times weekly for several weeks. A small piece of cotton-

wool is twisted on to a silver or aluminum probe, dipped into the solution, and then rubbed energetically over the whole of the diseased mucous membrane. The cocaine spray is used before and after the operation. An alkaline spray—the author recommends Schaeffer's aluminum-acetico-tartaratum solution—should be employed frequently by the patient.

Basing his argument upon results obtained in practice, Couëtoux, of Nantes,³⁷ concludes that atrophic rhinitis becomes ozænous as much on account of narrowness of the rhino-pharynx as of excessive width of the anterior nares, and that adenoid vegetations form an important element in some cases. He therefore advises that the rhino-pharynx be always carefully examined and treated, if necessary, the presence of growths in this location increasing greatly the chances of cure of the general process.

Syphilitic Rhinitis.—Lacoarret, of Salies-de-Béarn,³⁸ after calling attention to the fact that secondary syphilis of the pituitary membrane is rarely met with, reported the case of a boy of 17 years, who presented condylomatous growths of the anterior third of the septum at its junction with the floor. The condition might have suggested tuberculosis or simple papillary degeneration, but the diagnosis was confirmed by treatment. Moure, of Bordeaux,³⁹ added another case to the list of those of indurated chancre of the left nasal fossa. The lesion was situated on the quadrangular cartilage, where there was a fungous ulceration, the septum being thickened and tumefied. The ulcer was covered with a pseudomembranous ulceration, removal of which left a bleeding surface. Hicguet⁴⁰ saw two of chancre of the nasal septum. Both were typographers, who were accustomed to the use of snuff, and to utilize a box that served for all the workmen in the room. The other features of the history clearly point to this element as a cause. W. Milligan⁴¹ reported a case in which syphilis of the right nostril occurred as a second attack of the primary form, the first having taken place seven years before. R. Botey⁴² describes the case of a boy of 14 years, in whom a protracted rhino-laryngitis was finally found to be due to hereditary syphilis, the existence of the disease being afterward ascertained as being present in the parents. Appropriate treatment resulted in a cure.

A case of the same kind, in a man aged 21 years, is reported by Psalidas, of Constantinople.⁸⁷ Darzens¹¹ recommends a combination of the iodides of potassium, sodium, and ammonium in cases of urgent specific disease where the prompt effect of the iodide is highly desirable. In a man of 37, with severe syphilitic lesions of the nasal fossæ, who had been vainly treated by large doses of iodide, as well as other antisyphilitic remedies, he gave small doses of each of the three iodides and biniode of mercury, and obtained a most satisfactorily rapid impression without iodism or other unfavorable symptoms. He explains the result upon the idea that the other salts are eliminated more rapidly, and the potassium iodide is retained in the system until the others have disappeared, claiming that the kidneys excrete only a limited proportion of any such salt, which tends to retain the urine at approximately the same specific gravity. The intolerable headaches disappeared in a week, and the nasal lesions and dacryocystitis were practically cured in six weeks.

Myxoma.—Casselberry, of Chicago,¹ after recalling Zuckerkandl's researches on cadavers, by which he demonstrated that two-thirds of all nasal myxomata originated in the middle meatus, at the hiatus semilunaris and bulba ethmoidalis, expressed his conviction that exceptional cases are curable only after removal of the antero-inferior portion of the middle turbinated bone, to furnish the operator an opening through which he will be able to introduce appropriate instruments. Its purpose is also to afford a proper drainage-channel for the prevention of accumulation of mucopurulent material, and to relieve pressure. This opening he obtained by means of strong, though small, turbinated bone scissors, appropriately curved to insure clear vision, with serrated blades to prevent slipping. When the scissors cannot be manipulated, the snare will usually suffice. This procedure is supported by Dabney.²²⁴

Unusually large polypi are reported by Radziszewski⁵⁵¹; Murphy, of Cincinnati,⁵² and Ashhurst, of Philadelphia.⁹ In the latter case the growth blocked up nearly the whole of the space behind the tongue. Tracheotomy had to be performed to save life. Soon after the tumor was removed from the posterior part of the middle turbinated body by means of a wire loop passed through the nose to the mouth by means of a Bellocq cannula.

In a case seen by Nouguet,⁸⁶⁸ June 15, a red, raspberry-like, soft growth removed from the posterior aspect of the inferior turbinate bone turned out to be, upon microscopical examination, but a myxoma. Nouguet thinks that the passage of air over the growth may have caused this unusual color, which, macroscopically, would be misleading. Onodi, of Pesth,⁹²² reports a case of myxoma in which sarcomatous growths developed.

Although polypi in children are said to be rarely met with, S. Hopmann⁹¹⁸ July reports 8 cases in children under 15 years of age out of a total of 246 cases operated upon. Natier,¹⁵² Feb. 19 in reporting the case of a newborn in which he had operated for polypus, states that in perusing the literature of the subject he had found 2 cases of congenital polypus such as his, 3 cases of polypus in children under 5 years of age, 10 cases in children between 5 and 10 years old, and 16 in children between 10 and 15 years old.

Cysts.—Under the title of "Glandular Retention Cysts of the Anterior Part of the Nasal Cavities," Chatellier, of Paris, reports two cases, as follow¹⁸⁸ Mar. 18, 1888: Madame de X., 55 years of age, presented a tumor of the right side of the nose, raising the skin of the ala and extending outward toward the malar bone. Palpation showed it to be painless and non-adherent to the skin, which kept its normal color. The tumor was seen on the internal surface of the ala, jutting into the vestibule, and reaching to the anterior extremity of the inferior turbinate. Seized between the thumb and finger, the one within and the other outside the nasal cavity, the tumor was found to have the size of an almond, of firm and slightly-resistant consistence, as if filled with fluid. The coverings of the vestibule and inferior turbinate did not appear to be altered, either in color or shape, and the mass was not adherent to the bone, upon which it could easily be displaced. There were no general symptoms, fever, or pain. Though the presence of the tumor had become visible to the patient only fifteen days previously, when it began to increase in size, the patient could not fix the date of its commencement. Its round form, independence of the bony frame-work, and consistence caused Chatellier to think it to be a cyst developed at the expense of one of the glands of the nasal mucous membrane. An exploratory puncture was recommended, and the patient agreeing, it was operated upon on January 16, 1888. The parts were first cleansed with wads soaked in

Van Swieten's solution and cocainized, and the tumor then punctured on the internal nasal surface with a sterilized Pravaz syringe. Two cubic centimetres of viscous, light-brown fluid were withdrawn and preserved for histológico-bacteriological examination. The surface was then washed with a wad charged with fluid, and the tumor had completely disappeared. Next evening there was incipient erysipelas of the right naso-labial furrow, but no fever. This attack lasted four days, was very mild, invaded only a portion of the corresponding cheek, and produced no general symptoms. When this disappeared, the tumor commenced to reform, and in fifteen days had attained its former size; so that the patient wished for further operation. It was, however, allowed to discharge for a month before operating again.

At the second operation, after cocainizing and vigorous antisepsis, an incision in the convex surface formed by the tumor in the nasal cavity was made with the galvano-cautery, as little heated as possible. At a depth of two millimetres the cavity of the cyst was reached, and yellowish, muco-purulent liquid was discharged. The cautery was applied to all parts of the cyst, and it was dressed with iodoform gauze. There were no complications; the wound cicatrized rapidly, and three weeks after there was no trace of the operation, except for a slight depression a little in front of the anterior extremity of the inferior turbinated. The tumor did not recur. A year and a half after the cure was maintained. Histologically, the viscid fluid was composed of mucus, and contained numerous pus-globules. Bacteriologically, numerous chains of streptococci were seen, and were also cultivated on gelato-peptone.

Madame X., 32 years of age, presented a small tumefaction, which had appeared between the nose and the right cheek. It gave rise to no pain, but she became alarmed at its increase in size. It formed an ovoid mass, as large as an almond, under the skin, which moved freely over its surface and was unaffected. The tumor projected into the interior of the nasal cavity, depressing the skin of the vestibule and effacing the concavity of this region. Being freely movable, excluding the idea of a growth from the maxillary bone, also of firm consistence, but not that of a solid body, the diagnosis was made of glandular cyst. Antisepsis by liquor Van Swieten being obtained, puncture was made with a sterilized

Pravaz syringe, and 1½ cubic centimetres of muco-purulent, thready, and yellowish fluid were withdrawn. One and a half cubic centimetres of liquor Van Swieten were injected and withdrawn. This was repeated several times, until the fluid withdrawn was normal. A tampon of iodol gauze was inserted, so as to fill the whole vestibule. No complication occurred, and the cyst did not refill.

In reviewing these two cases, Chas. H. Knight, of New York,¹⁵¹ expresses his opinion that reference has been made to at least three distinct and independent pathological processes which have not the slightest relationship, namely, glandular retention cysts, cystic degeneration of nasal myxomata, and cyst of the turbinate bone. The first may be found in any region supplied with glandular elements; the second is not peculiar to myxomata, but is met with in various neoplasms, especially at a late period of their existence; while the third has been observed, with perhaps two exceptions, only in the middle turbinate bone. Although the etiology of the last mentioned has been by no means clearly established, it is difficult to see how one can maintain that it is merely an "anomaly of development." Knight¹⁵¹ published an article on cysts of the middle turbinate bone, reporting a case of his own. In explanation of the origin of these growths he suggests (1) that they are the result of a rarefying osteitis similar to that occurring in the long bones; (2) that they have their origin in an osteophytic periostitis, secondary to a hypertrophic rhinitis. The cyst is often multilocular, and contains air and mucous or purulent fluid.

The indications for treatment are thus enumerated: 1. Interference with nasal respiration. 2. Prevention of nasal drainage. 3. Reflex neuroses. 4. Anosmia. 5. Impaired quality of the voice.

Unless the cyst be so large as to cause pressure or impede nasal breathing, it is seldom necessary to interfere. The bone is usually so thin that it may easily be crushed with forceps if desirable, and redundant tissue may be removed with cutting forceps. In large cysts, especially if associated with polypoid growths, the cold-wire snare will be found to be most serviceable. The pain of the operation, in spite of the free use of cocaine, is sometimes considerable, and subsequent reflex neuralgias are not infrequent.

Hæmorrhage is seldom excessive, and in several cases it was surprisingly scanty.

Landgraf, of Berlin, ⁶⁰ presented a patient from whom he had removed a cyst of the middle turbinated body. The man had suffered for a long time from chronic coryza, and hypertrophic nodes of the middle turbinates had been found and removed. A tumor then appeared, microscopical examination showing it to be a cyst, with a rich layer of cylindrical epithelium; in the interior of this cyst were found nuclei of cells and crystals. The author looked upon it as a retention cyst.

The subject of cysts in the upper respiratory tract is ably reviewed by P. McBride, of Edinburgh. ² Cases are reported by C. W. Richardson, of Washington, D. C., ¹¹⁵ and W. B. Babcock, of Los Angeles, Cal. ⁴⁴

Angioma.—Bellows, of Boston, ⁷⁷⁶ reports the case of a woman, aged 37 years, in which there was a purple tumor of the septum; its dimensions were about those of a chestnut. Bleeding was very easily induced on touching it with a probe. It was removed with Jarvis's écrasur. In three weeks it recurred, and was then painted twice daily with a saturated solution of bichromate of potash, and it gradually disappeared, and no recurrence had taken place five months later. Microscopically it was a cavernous angioma.

Rhinoscleroma.—Excellent reviews of the subject were published by A. Castex, of Paris ¹³⁶ Mar. 18; Apr. 1.; W. G. T. Story, of Dublin ¹⁶; June; and Moskowitz, of Budapest. ⁶²² Cases were reported by Srebury and Bujwid, ⁷⁸³ Colombini, ⁵⁸⁹ Sept. 18, 14 Secretan and Stilling, of Lausanne. ¹⁹⁷ Mar. 20. None of these papers present new facts.

Epithelioma.—R. Dreyfus, of Strasburg, ²⁸⁶ reports a case of this neoplasm and gives a valuable review of the literature of the subject.

Sarcoma.—Euthyboule, of Constantinople, ⁸⁷ and Wygodzinski, of Würzburg, ²¹⁸ report each a case of sarcoma; both diagnoses being confirmed by microscopical examination. A case of primary fibrosarcoma is described by J. Cisneros, of Barcelona. ⁹¹⁸ (Report of R. de la Sota, corresponding editor, Seville, Spain.)

Katzenstein ⁶⁹ presented to the Laryngological Society of Berlin a man of 24 years, in whose right nasal cavity there was a

tumor presenting the macroscopic appearances of sarcoma. This diagnosis was confirmed by microscopical examination. Küster removed this tumor, and found that it was united to the septum. The tumor recurred in two months, this time occupying the entire nasal cavity on the right side. Operation was absolutely impossible. An interesting point in the case was the disturbance in the movements of the eyes, especially the right one.

Fibroma. — Suchannek, of Zurich,²¹⁴ describes a pendulous fibroma of the septum produced by fracture, the point of origin being probably a portion of torn mucous membrane. The ciliated epithelium had been transformed into pavement epithelium.

Tuberculosis and Lupus. — P. McBride, of Edinburgh,²¹⁵ considers the identity of lupus and tuberculosis as now established beyond dispute, although what determined the appearance of lupus at one time in a particular locality and tuberculosis at another time in a similar site was still a mooted point. Further, while each was due to the presence of the tubercle bacillus, the two processes differ absolutely in almost every clinical feature, and he points out that the bacillus is present in scant numbers in the lupus form of the disease. Taking in detail the sections of the upper air-passages, McBride said that, in his experience, lupus was far more frequent than tuberculosis in the nasal passages; in the pharynx the two forms had occurred with almost equal frequency, while in the larynx tuberculosis predominated greatly over lupus. Below the cords he was not aware that lupus had been seen. In his experience ulceration of the lupous growths in the nasal passages and larynx was by no means common, although such experience was contrary to that of most other clinicians. Mackenzie Johnston suggested that probably the occurrence of lupus in the higher portions (anterior nares, etc.) was in part at least dependent on the supply of a larger amount of purer oxygen than could possibly reach the larynx,—for example, where the tuberculosis form predominated. His experience as to the ulceration of lupus did not coincide entirely with McBride's.

Cozzolino, of Naples,¹⁴,⁵³ has tried with success the following treatment of lupus of the nasal mucous membrane: After twelve to fifteen applications of the galvano-cautery, which suffice to destroy the exuberant granulations of the ulcerous membrane,

he employs the following formulæ to hasten the repair of the tissues :—

1. Nasal douche morning and evening of tepid water, to which has been added a teaspoonful of the following mixture :—

R Rectified alcohol,	. . . . .	3viss (200.0 grammes).
Naphthol,	. . . . .	3iss (10.0 grammes).
Menthol,	. . . . .	gr. viiss (0.5 gramme).
Thymic acid,	. . . . .	Mxxx (2.0 grammes).—M.

2. After the douche, every three or four days, apply the following solution upon a tampon :—

R Distilled water,	. . . . .	3iss (50.0 grammes).
Trichloracetic acid,	. . . . .	3iss (6.0 grammes).—M.

3. During the days when this solution is not applied the following is used, night and morning :—

R Camphorated naphthol,	. . . . .	3v (20.0 grammes).
Pure carbolic acid,	. . . . .	Mviiss (0.5 gramme).
Glycerin,	. . . . .	3vj (25.0 grammes).—M.

4. If there form yellowish, dense crusts, which are characteristic of this affection, then, instead of detaching them at once, they may be softened by the application of the following salve :—

R Vaseline,	. . . . .	3i $\frac{1}{2}$ (40.0 grammes).
Aristol,	. . . . .	gr. xliv (8.0 grammes).
Mercurialized iodol,	. . . . .	gr. v (0.3 gramme).—M.

5. During the day the following powder may be insufflated ten or twelve times through the nose :—

R Aristol,	. . . . .	gr. xliv (8.0 grammes).
Pulverized naphthol,	. . . . .	gr. viiss (0.5 gramme).
Boric acid,	. . . . .	3iss (10.0 grammes).
Resorcin,	. . . . .	gr. xxx (2.0 grammes).—M.

In 21 cases of lupus, Brieger, of Breslau,⁴ found that but three did not present involvement of the ear. Gradenigo's histological observations have proved that lupus cannot extend along the Eustachian tube from the nose to the middle ear. Most of Brieger's cases presented the characters of ordinary catarrhal or suppurative inflammation. Only in one case could the tuberculosis bacillus be found. In the cases believed to be of the specific lupous nature there were patches of lupus in the naso-pharynx. Schwartz mentioned a case of lupus of the tip of the nose, rebel-

lious to all treatment, in which there occurred later a suppurative inflammation of the middle ear and of the mastoid, and death in six months from pulmonary tuberculosis.

Congenital Occlusion.—A. W. Watson, of Philadelphia,¹⁰⁵¹ reports a case in which the right naris was completely occluded by a rigid plate of bone, presenting a shallow central depression. The latter was made the resting-point of a gouged chisel, which, after considerable difficulty, was caused to penetrate the occluding bony wall. The finger of the free hand was passed posteriorly to act as guide and to afford protection. The case was probably one of congenital bilateral occlusion, a previous operation having corrected a similar deformity in the patient's other naris. When, after resorting to the usual means of correcting deformities of the nares, he did not succeed in obtaining a satisfactory lumen for proper breathing, P. J. Gibbons, of Syracuse,¹, recommends the employment of an intra-nasal tube which he has devised, and which, among other advantages, presents that of non-interference with the physiological functions of the mucous membrane, which functions are usually arrested by the use of the tubes so far introduced. It consists of a tube, made of any suitable material, such as aluminum, silver, gold, rubber, etc., metal being preferred, as it will dilate and maintain the calibre of the nasal cavities. The walls of the tube are filled with minute perforations which permit the air, during inspiration and expiration, to come in contact with the lining membrane of the nasal chambers, thus allowing the membrane to carry out its normal physiological action. The openings through the walls of the tube permit the administration of sprays. A cocaine solution is used for the introduction and the removal of the instrument. The author also uses it to arrest epistaxis by covering the tube with rubber tubing to occlude the openings. Schwendt, of Zurich,²¹⁴,_{Apr. 1} communicates an interesting case of a boy of 11 years, with congenital bilateral stenosis of the posterior nares. The sense of smell was completely absent; that of taste, on the other hand, was well developed, and the appetite excellent. The general health was good. Examination of the nose showed that the inferior and middle turbinateds were somewhat atrophied, and that a sort of osseous diaphragm covered the superior nares; the tubes were normal, the tonsils hypertrophied. After operation, the patient was able to breathe freely.

through the nose, which before had been impossible. The sense of smell remained very defective.

Foreign Bodies and Rhinoliths.—Among the objects entering into the category of foreign bodies introduced into the nostrils and there causing the active symptoms usually noted may be mentioned: A piece of laminaria introduced to cure stenosis resulting from small-pox and forgotten *in situ*, reported by Hessler, of Halle²⁴; a pledget of cotton-wool, reported by Gerber, of Königsberg.²⁵ These are selected from the numerous papers on the subject (which but repeat common occurrences) to afford a warning to intra-nasal operators.

Epistaxis.—A. Harkin, of Belfast,¹⁶ contributes evidence in favor of the hepatic origin of nasal, as well as anal, idiopathic haemorrhage. He contends that the starting-point in the constitutional disorder which takes the form of anaemia or hyperæmia, and of which epistaxis is a frequent result, is "clearly due to an abnormal condition of the tissue or cells in the liver, secondarily the blood and general constitution." He therefore advocates as treatment the free administration of chlorate of potassium alone or in combination with iron, and counter-irritation over the liver, a large blister being practically the most convenient form. In a case seen by Mounier, of Paris,¹⁵² the bleeding-point he found in the anterior nasal cavities. Posterior rhinoscopy revealed it in the vault of the pharynx, on a level with Luschka's bursa. He concludes that although haemorrhage from this location is rare, the possibility of its origin from the pharyngeal vault should be remembered by the examining surgeon; the usual methods resorted to, having for their object the blocking up of the bleeding narium, result in this form of epistaxis, only in turning the flow in the direction of the mouth. He considers an aqueous solution of antipyrin, 1 part in 5 or 1 in 10, as better than the perchloride of iron in every way.

Gellé²⁶ discusses the results which may follow this procedure. In many cases suppurations of the middle ear are liable to occur, and cerebral complications may follow the affections of the ear. The suppurations in the middle ear are due to two causes, namely: (1) Passage of blood from the bleeding surface along the Eustachian tube into the cavity of the middle ear, either during the act of plugging the posterior nares or previous to this; (2) passage of the

products of decomposition of the blood around the tampon when it has been allowed to remain in position for a few days. In the first set of cases the blood which passes into the tympanic cavity is infected with septic micro-organisms, and soon becomes the focus of septic processes, giving rise to the production of pus. This cannot well escape by the Eustachian tube, and the collection often makes an exit for itself by perforating the membrana tympani. In the second set of cases septic products or inflammatory processes pass along the Eustachian tube into the tympanic cavity, and give rise to the same results as in the first case. The longer the tampon is left in position, the more probable is the occurrence of septic processes in the middle ear. Gellé maintains also that this procedure is not only liable to be followed by the above results, but also that it may be the cause of death. He refers to a case which he published in 1882, which terminated fatally owing to cerebral complications. He then reports the case of a man, aged 54, in whom plugging of the posterior nares was carried out for severe epistaxis. The tampon was kept in for three days and a half. This was followed by suppuration of the right middle ear. Pus discharged by rupture of the membrana tympani through the external auditory meatus. Inflammatory swellings also appeared in the region of the mastoid process and the side of the neck. Ultimately the patient incompletely recovered.

Natier, of Paris,⁶⁴⁸ also reports a case of otorrhœa occurring as a result of the continued presence of a tampon introduced and left *in situ* by a hospital nurse for six days. In the discussion following the reading of Gellé's paper before the Paris Society of Laryngology and Otology, Chatellier expressed his disapproval of posterior tamponnement, believing that, as the haemorrhage is generally due to the displacement of a clot formed on the antero-inferior portion of the septum, the application of an anterior plug is adequate for the controlling of the flow. Gouguenheim stated that when the material employed is composed of iodoform gauze, septic complications need not be apprehended (provided, we may add, that it be not left in the cavity too long). Chatellier preferred iodol or salol to iodoform gauze. Gellé had arrested copious haemorrhages by subcutaneous injections of ergotin.

Barth, of Berlin,¹⁴ attended 52 cases of epistaxis during the last five years. In 6 of these cases the flow came from the car-

laginous septum; in 5 it was due to superficial ulceration of the middle and inferior turbinated bodies; in 3 it was due to tuberculosis or lupus; 13 haemorrhages had originated in the rupture of a blood-vessel over the triangular cartilage; in 7 cases ulceration and rupture of a blood-vessel existed together; a small tumor of the septum caused epistaxis in 2 cases. Five patients bled from the right nostril, 15 from the left; 2 from both sides; in 3 the side could not be ascertained. No cardiac disease could be discerned in any of the cases. The cavernous tissue of the turbinated bodies furnished the flow in no case. Cros and Imbert,¹⁴ publish observations upon some cases of malaria in which rebellious epistaxis of the left nasal cavity was controlled by revulsion over the spleen. No examination of the nasal fossæ was made.

SEPTUM.

Potiquet, of Paris, ^{21, 22} discusses the etiology of deviations of the septum. He has only occasionally encountered a straight septum, but he has never observed deviation of the posterior portion, which, while being rectilinear, divides the nasal fossæ unequally. Of all deviations, the most frequent is that which, leaving the superior edge of the vomer and its vicinity, goes from the anterior spinous process to the sphenoid, this form having more of a tendency to occlude the left than the right side.

Most of the causes ascribed by various authors for deviation of the septum are easily refuted, such as decubitus, the pressure exercised by the erectile tissue of the turbinated (this latter could cause but very superficial impressions, according to Potiquet); rachitism, syphilis, and adenoid vegetations are not admissible. As to the projection into the mouth of the portion of the palate underlying the vomer, to prevent deviation by giving more perpendicular room in the nasal cavity, Potiquet has proven the falseness of this in his dissections, the crest which he observed on the palatine vault belonging to that bone, and not to the vomer.

Potiquet admits but two causes,—traumatism and accidents of development; and traumatism as a cause is exaggerated, as the vomer and the perpendicular lamina of the ethmoid cannot be considered as a cause, owing to their depth in the cavity, while fractures of the cartilaginous lamina are almost always vertical,

scarcely ever oblique or perpendicular. The chief cause, according to Potiquet, is the want of harmony between the bridge and its frame, as shown by comparative anatomy, and the absence of symmetry in the skull, in the white man. Potiquet accepts the theory of Lissauer, that, under the influence of the growth of the brain, the axial outline of the cranial vertebræ tends to curve inward so much the more antero-posteriorly as the upright posture is assumed in mammals, reaching a maximum in the European, and increasing with age. In this process of evolution the septum describes a rotatory movement from above downward and from behind forward, taking the sphenoidal body as a centre. Potiquet questions if this deviation of the septum does not give rise to the difficulty which must be experienced by the cartilaginous lamella in adapting itself to this antero-posterior movement, which the crano-facial area undergoes from birth to adult age. Potiquet made a further study of about fifty skulls¹²⁸ _{p.47} to determine whether the opinions he had previously expressed were justified. In half the cases the deviation was in relation with the movement described in the previous article, but in different proportions,—more or less in certain subjects than in others. The rule which he sought to establish was not verified in a number of subjects, and he therefore concludes that the hypothesis advanced by him, while justified in many cases, does not explain all deviations. There are, consequently, other causes which aid in their formation, but the cranial asymmetry which results from the elevation of the bones of the skull and the face in mammals, described by Lissauer, appears to him to be often the cause of deviations.

Thickening of the nasal vessels of the antero-inferior portion, and the rôle of the subvomerian bones and cartilages, are also discussed by Potiquet. He finds that these bones play a considerable part in the formation of crests and deviations. United to neighboring parts of the cartilage, the subvomerian bones, in deviating and thickening, impinge upon the inferior meatus ; under the influence of displacements of the bones of the face, the subvomerian bones and cartilaginous lamina tend to curve, producing simultaneously the deviation and thickening which go to form the crests. The cartilages of Jacobsen also play an important rôle in the formation of these thickenings, because of the formation of osteo-

blasts in their centres. (Report of A. Gouguenheim, corresponding editor, Paris.)

Mauclaire⁷ has studied the septum in the foetus, the child, and especially in the adult. In the foetus he has observed the slight height of the posterior edge of the bridge, and the absence of deviation, this last peculiarity being found in the infant as well. He has studied 51 adult septi, finding only 6 vertical and smooth. He has made the following classification of the deviations: Deviations; simple antero-posterior spurs; spurs and deviations. The direction of spurs being antero-posterior, the projection is at the union of the vomer with the perpendicular plate of the ethmoid, being more marked in front than behind,—an important point in therapeutics.

Spurs may coincide with the deviations. The origin is usually a hyperchondrosis, the etiology of which varies, but the author usually found it to depend upon inflammation of the mucous membrane. Syphilis, rachitism, and adenoid vegetations have also been cited as causes. Mauclaire thinks that the determining cause of these alterations is always traumatism; and his sections lead him to conclude that an inflammation in the posterior part of the nose (an abscess, for example) is propagated by the perpendicular plate of the ethmoid and the vomer, and by the lateral cartilages and bones of the nose. In studying the mucous membrane, Mauclaire has observed a thickening in the posterior border, which he believes to be the first step toward the formation of adenoid vegetations. (He has observed the presence of an arteriole, a branch of the spheno-palatine artery, which, by its descent obliquely and anteriorly, makes an impression upon the wall of the vomer.) The lymphatics, abundant in young subjects, take an antero-posterior course, and form veritable ganglia near the superior portion of the posterior edge of the septum.

Mauclaire has located the seat of the orifice of the sphenoid sinus, which is rounded, very high against the bridge, two millimetres from the septum, and two millimetres in size. From this the conclusion is formed that to reach it it is necessary to pass between the middle turbinate body and the septum, in a direction from below upward, at an angle of 45 degrees with the floor of the nasal fossæ.

These conclusions are of value from an anatomical stand-point,

but contestable from an etiological stand-point, as to deviation and adenoid vegetation. (Report of A. Gouguenheim, corresponding editor, Paris.)

Chatellier, of Paris,²⁸⁶ has determined, from sections of nasal fossæ in human embryos of three to four months' gestation, that ossification commenced in the vomer, superior and inferior maxillæ, and the middle and inferior turbinate bones, the ethmoid being at that time completely cartilaginous. The perpendicular plate at its centre presents a considerable thinning; is this, then, the weak spot, therefore, of the septum? The quadrangular cartilage is prolonged in front of the perpendicular plate, and is insinuated like it between the two laminæ of the vomer. The latter is formed by a body of small height; and at its upper border it is divided into two laminæ, which separate to form an open antero-posterior furrow above, in which is placed the inferior edge of the perpendicular plate and of the quadrangular cartilage. The septum may then be considered to be constituted by two segments,—the upper one formed by the perpendicular plate and the quadrangular cartilage, the lower one by the vomer. These two segments are united to form the ethmoido-chondro-vomerine articulation, the means of union being the connective tissue covering the furrow of the vomer. This articulation is the second weak spot of the septum.

The inferior wall of the nasal fossæ is formed by the palatine apophyses, of which the two upper and inferior laminæ, not yet joined to each other, advance toward the middle line in front of their congeners of the opposite side. But the right and left osseous plates are not yet in contact. Between them there exists a space, filled with connective tissue, on which rests the inferior edge of the vomer. This point is the weak spot of the osseous walls of the nasal fossæ.

Remembering that the perpendicular plate and the quadrangular cartilage are developed from the median bud of the face and the upper maxillæ and their palatine apophyses from the lateral buds, this difference of origin is not without influence on the later development. Whatever causes modify the parallel development of the septum (median bud) and the lateral walls of the nasal fossæ (lateral buds), we may conceive that in certain cases the septum may be too long for a cavity the vertical dimensions of which are proportionally too small; the septum will, therefore, be

obliged to be outside the cavity which incloses it, or must diminish in length.

After condemning the pressure method of treatment, such as that practiced by the introduction of fingers, etc., utilized by old-time operators, he advocates an operation proposed by Petersen in 1883, which he describes as follows: "After cocainizing both sides of the septum, a first horizontal incision, preferably with a bistoury, is made parallel with the insertion of the septum in the floor, and a second incision, vertically, is made in the prominent part of the deviation; with a sharp instrument the mucous membrane, periosteum, and perichondrium are cut through together, thus exposing the whole part of the projection. The septal skeleton is then cut through to the under surface of the perichondrium of the opposite side, thus avoiding perforation of the mucous membrane of the opposite side, which is difficult when the curvature is sharp. Through this orifice the septum is separated from the integuments; then with chisel and punch the skeleton is resected as much as possible, thus removing the whole of the projecting portion. This part of the operation, easy when involving only the quadrangular cartilage, is much more difficult when the vomer or perpendicular plate of the ethmoid has to be resected. When all the obstruction is removed, it is only necessary to replace the mucous flaps side to side (periosteum against periosteum). An iodoform tampon suffices to maintain the parts in contact, and no suturing is necessary. The first tampons are removed at the end of forty-eight hours; the second after two days, boracic ointment being then employed. After the first tamponing, the parts are already healed together without any perforation. The safeguards against this are better in this operation than in Krieg's, who removes the mucous membrane of the projecting side. The author has performed the operation five times with complete success. In a sixth case, where the curvature produced a very acute angle, a small perforation resulted."

Mayo Collier, of London,¹¹ considers, as the principal cause of deviation, the prolonged obstruction of one nostril, as often occurs in some forms of rhinitis. The air in the obstructed nostril is rarefied at each inspiration, causing a proportionate pressure on the other side of the septum. The latter is thus subjected, as it were, to a series of intermittent blows, varying in power from one

to twenty pounds during each inspiratory effort, which pushes in the thin wall of the nasal cavity if continued sufficiently long

Hajek, of Vienna,⁵⁷ rightly thinks that there exists no single operation suitable for all cases of deviation of the septum, but that modifications must be introduced to meet individual cases. Two points must be determined: (1) if the deviation be circumscribed; (2) if it comprise almost all of the cartilage, with a portion of the bone. In the first case Hajek excises all the bony part projecting, with the mucous membrane, according to the method of Schech. For the second class of cases, more difficult for operation, the author has invented the following procedure: The nasal cavity is disinfected with a weak solution of creolin, and the posterior nares tamponed with iodoform gauze. Cocaine is applied to the septum, and three incisions made in such a way as to convert the cartilaginous portion of the septum into a movable fragment, attached only at the upper part. The cartilage is then straightened, and held in place by iodoform tampons. This method has given good results in several cases of the author, the cure having persisted.

In the treatment of deviations and spurs by electrolysis, Bergonié and Moure, of Bordeaux,²⁵ state, in a very able contribution to the literature of the subject, that the monopolar method should not be preserved, owing especially to the liability of perforation of the septum attending the irradiation or dispersion of electrolytic currents. The concentration of the current within the sphere of the growth naturally presents itself as a desideratum, not only to avoid the destructive action of dispersion, but to avoid, for the patient, the suffering—often severe—attending its use. The authors employed steel needles, isolated by means of rubber tubing. An interesting review of the subject of spurs was contributed by J. A. Thompson, of Cincinnati.⁵⁸

A device for correcting deformities of the nose resulting from traumatism was introduced by Walter B. Johnson, of Paterson, N. J.⁵⁹ The instrumentation and the operation proposed aim at a refracture and union in proper position of traumatically-displaced nasal bones. The instruments used are an elevator, a retentive apparatus, and a plaster cast to assist in retaining the parts in their proper position after the operation.

The elevator is shaped somewhat like a tuning-fork mounted on a strong handle; it is so constructed that it will resist a con-

siderable pressure. The retentive apparatus consists of a bone plate, having two slits through which is passed the head-band for holding the apparatus in position. To this bone plate are riveted two flat wire springs, spring coils furnishing the necessary pressure. At the ends of these springs two bone tips are fastened, which are of the same shape, size, and length as the prongs terminating the elevator. The plaster cast is made of several successive layers of muslin, impregnated with plaster of Paris, and should be prepared immediately after the operation, when the parts are in their proper position, before tumefaction has occurred; it should cover the nose from the base nearly to the apex, and extend over each side, resting on the cheeks.

The operation is performed in the following manner: After adjusting the prongs of the elevator, so that the points will be as closely approximated as the thickness of the septum nasi will permit, and when the patient is thoroughly anaesthetized, pass them well up into the nostrils and under the nasal bones. The left hand is then rested on the patient's upper jaw, to be used as a fulcrum, and steady downward pressure made upon the handle of the elevator; the pressure is continued until sufficient force is developed to separate the bones and raise them into position; the force required will be very considerable, and should be made toward the most sunken side of the nose; the bones generally separate with a suddenness that is alarming, suggesting the possibility of the accidental removal of the entire nasal organ. The plaster cast should then be made, and, when the plaster has thoroughly hardened, be removed and reserved for future use. The after-treatment is not commenced until the following day. The bone tips of the retentive apparatus, after being well smeared with vaselin, are introduced into the nostrils, and the plaster cast is placed in position over the bridge of the nose and retained by strips of adhesive plaster, the whole apparatus being worn from two to four hours each morning and evening. This treatment is continued daily, the length of time during which the apparatus is worn each day depending on the degree of irritation produced thereby.

The advantages claimed for this operation and mode of treatment over the old methods are: 1. The thoroughness, rapidity, and the comparative ease with which the operation is performed.

2. The ability to maintain, during the operation, an even pressure on both nasal bones at the same time, or greater pressure can be exerted on either side, if required, in consequence of more extensive sinking, by simply tilting the fork. 3. The absence of any external injury, which may occur in using the forceps. 4. The fracture produced is simple, instead of compound, as in the chiseling operation. 5. The value of the retentive apparatus in preventing subsequent sinking. This operation has been performed on the two cases which are reported.

NEUROSES.

Anosmia.—Ragoneau¹¹ ascribes anosmia to hyperæsthesia of the mucosa, this occurring as a result of hypertrophic rhinitis attended with marked intermittent rhinorrhœa. Reduction of the thickened membrane brought about complete recovery of the senses of smell and taste. Judging from the cases reported, it seems evident that the improvement brought about was due more to the cessation of the stenosis, and, therefore, of the impediment to the passage of the odoriferous particles to the olfactory area, than to the reduction of the hyperæsthesia.

Ghislani Durant, of New York,¹² published a case in which treatment of a marked gouty trouble in a young woman by ichthyol completely cured an anosmia of several months' standing. The fact that nothing was done to the olfactory leads him to suggest the gouty diathesis as a possible cause.

Luc, of Paris,¹³ reports two cases of anosmia, the causes of which were prolonged cauterizations in the one and a severe operation in the other. They were both cured by electrical treatment, the first case requiring eleven sittings. Schalk⁵⁹ reports a case in which a fall, the occipital protuberance receiving the brunt of the blow, was followed by forty-eight hours of semi-coma, and then permanent anosmia. A review of the subject was given by O. Preston Bennett, of Chicago.¹⁰⁹

Parosmia.—An interesting series of cases of parosmia are alluded to by A. Onodi, of Budapest,¹³⁸ observed in the course of influenza; tar, glue, lacquer, sulphur, garlic, rotten meat, soap, petroleum, etc., were the symptomatic odors complained of; he ascribes the neurosis to a peripheral irritation of the olfactory organs. He believes his cases to have been the first

reported, in which the association of parosmia and influenza is recognized.

Hay Fever.—R. Shawe Tyrrell, of Toronto, ²⁹, a sufferer from the disease, refers to lithæmia as one of its causative agents. Besides a well-governed diet and sufficient exercise to maintain hepatic action to the proper standard, he recommends salicylate of soda, gr. xx (1.3 grammes), on retiring. Edw. S. Blair, of Correctionville, Iowa, ³⁰, recommends *Euphorbia pilulifera*, an Australian and West Indian plant, regarded by the natives as excellent in the treatment of all affections of the respiratory tract. It afforded considerable relief in a marked case, the fluid extract being used. The dose is not given.

P. Watson Williams, of Bristol, Eng., ³¹, has employed the following method of treatment in several cases, among which is his own: The nose is sprayed with a solution of iodide of mercury (1-1000), the parts having been previously anæsthetized with cocaine. As soon as the effect of the latter passes away the pain becomes intense and lasts for two hours; he therefore usually administers a hypodermatic injection of morphia immediately after the application of the spray. The mucous membrane usually swells sufficiently to entirely block the nose, and the conjunctivæ become suffused and greatly irritated. After the cessation of the acute symptoms a catarrhal state occurs, lasting some thirty-six hours. After this the nose assumes its normal condition minus its tendency to become an active part of the disease, the patient remaining free the rest of the season. Williams ascribes the beneficial influence resulting from applications of solutions of chromic acid to the irritation produced, rather than to their antiseptic value.

L. A. Rixa, of New York, ³², extolled the merits of terpin hydrate (turpentine acted upon by alcohol and nitric acid), first recommended by Lépine, of Lyons, in 1885. Rixa administered it in capsules of 5 grains (0.3 gramme) each, 15 grains (1 gramme) being given during each of the three meals and at bed-time. If the asthmatic symptoms occurred on a damp, cloudy day, another dose should be administered during the night. The results were highly gratifying, the paroxysms having returned in but one case out of ten treated. The drug occurs as colorless crystals, and is not at all unpleasant to the taste.

Terpin hydrate was also recommended by Hugo J. Loebinger, of New York,¹ the dosage being the same, but being limited to three times a day, after each meal. An hour after the first dose a copious, light, fluid expectoration occurred, cessation of the asthma taking place at the same time. The improvement became permanent, when the administration of the remedy was continued. Its absolute harmlessness is insisted upon, the point having been previously demonstrated on animals by Germain Sée, of Paris. J. I. Taylor, of Memphis, Tenn.,⁷⁴ reports successful results by the electro-cauterization of terminal filaments of the nasal cavities, one of the cases described presenting the affection in a very severe form.

Lethargy.—Roguer Casadesús⁶³³ reports the case of a young girl in whom the author could produce a lethargic state, succeeded by clonic convulsions of the upper and then lower extremities, by the application of a probe to certain sensitive spots of the Schneiderian membrane. When the latter would be anæsthetized with cocaine, the phenomenon could not be produced. Cauterization of the sensitive spot caused cessation of the reflex spasms.

Asthma.—Bosworth, of New York,¹ reported his results in eighty-eight cases of asthma in which there was a co-existent intra-cranial lesion of a turgescent character, this list being composed of cases not included in the series of eighty reported four years before.⁵ Forty-two are considered as cured, 30 improved, 2 unimproved, while in 11 the results are unknown. The local lesion was, in the majority of instances, nasal polypus, deflected septum, or hypertrophic rhinitis. Bosworth considers as cured a patient who has passed through twelve months of immunity,—a complete cycle of seasons,—and considers that in the restoration of the nasal mucous membrane to a condition of healthy function we remove one of the very active causes of the asthmatic paroxysm, and thereby are notably aided in the complete cure of the disease. In thirty-five cases treated by L. E. Blair, of Albany,¹⁹ abnormalities of the nasal cavities were invariably observed.

Réthi, of Vienna,⁹¹⁸ alludes to a case in which the nervous element was clearly demonstrated by circumscribed œdema of the skin occurring instead of paroxysms of asthma, occasioned by engorged Schneiderian membrane, of which the patient in question

had been a sufferer for over a year. When the asthmatic symptoms were absent during the course of the galvano-cautery treatment employed, the œdema would appear, the two manifestations having appeared simultaneously but once, and that very slightly. As soon as the nose had recovered its normal state all symptoms disappeared. In Réthi's opinion, a vasomotor exudation was the cause of the asthmatic symptoms, and the œdema was merely the result of the same reflex action on other parts of the system.

Lazarus³²⁰,_{n.1} conducted experiments in tracheotomized rabbits with a view to ascertain the influence of nasal reflexes upon the calibre of the bronchi. Mechanical or electrical irritation of the nasal membrane reduced the diameter of the bronchi. The centrifugal action followed the course of the pneumogastric nerve, section of which was followed by cessation of bronchial contractions. The latter were, in all probability, due to contraction of the bronchial muscle.

In an article on the intra-nasal origin and surgical treatment of asthma, H. L. Swain, of New Haven,¹⁹,_{Aug. 20} concludes that the treatment of intra-nasal, abnormal, co-existing conditions contributes as much to the relief and cure of asthma as any other method now known, and very nearly as much as all others put together. W. S. Jones, of Camden,⁸⁰,_{July 18} reports twenty-three cases, nineteen of which were cured by treatment of nasal disorders.

Graves's Disease.—Musehold¹³⁶,_{July 15; Sept. 17},² describes a case of Basedow's disease which was accompanied by an enlargement of the posterior half of the right inferior turbinate bone. This portion was removed by the galvano-caustic snare, with the result that the headache at once disappeared, the palpitation gradually improved, and, seven days after, the heart was nearly normal. The goitre, however, persisted, and was treated by mild, continuous currents; two months after nearly all the trouble had disappeared. This case seems to indicate that Basedow's disease is sometimes due to reflex causes, removal of which will also remove the trouble.

Baumgarten,⁴⁰⁴,_{n.44} in a work upon the reflex neuroses of the nose, based upon personal cases, lays particular stress upon adenoid vegetations as a cause.

ACCESSORY CAVITIES.

An important study was made by Guillemain and Terson¹⁰⁰,_{Apr. 19} upon the orbital and ocular complications observed in diseases of

the frontal, maxillary, and sphenoidal sinuses. The frontal sinus is the one which most affects the orbit, since collections of pus from this sinus open habitually into it; the abscess either opens internally (the most common) or externally. The uneven contour of the orifice of communication with the sinus may be felt by the finger. The ocular symptoms are: compression; enormous œdema of the upper eyelid; serous chemosis projecting in the form of reddish folds across the constricted palpebral opening; immobility of the globe, which projects forward, with inferior external strabismus. The ophthalmoscope shows œdema of the fundus and venous dilatation. Sometimes œdema abscess of the orbit develops without communication with the sinus (neighboring abscess of Panas). Opening of the abscess is followed by arrest of the symptoms, but with remaining fistula. The diagnosis rests between phlegmon of the orbit, tenonitis, dacryocystitis, etc.

The orbital complications of the maxillary sinus are: supra-orbital neuralgia, simulating an affection of the frontal sinus; reflex lachrymation, or by compression of the naso-lachrymal apparatus; sometimes propagation occurs from the orbit to the frontal sinus, causing intermediate inflammation. A rare complication is phlegmon of the orbit.

Diseases of the sphenoidal sinus may be propagated in various ways,—either by osteitis and neuritis of the optic nerve, by meningeal infection reflecting upon the nerve, or by phlebitis of the cavernous sinus. There are two classes of troubles,—the first being vascular, with infection of parts of the vessels; the second, nervous lesions, material or functional. All are often unilateral. Group 1, thrombus of the sinus (ptosis, chemosis, exophthalmia, orbital phlegmon); group 2, reflex troubles (lachrymation, photophobia, blepharospasm, troubles of accommodation), optic neuritis (ototonus, narrowing of the visual field, sudden monocular amaurosis, which may be cured or lead to atrophy of the fundus). If the disease be unilateral, the presumption is in favor of an affection of the sphenoidal sinus.

The authors conclude that orbital manifestations are almost always present in affections of the sinuses, and that an effort should always be made, by means of operation, to evacuate the infectious products through the nasal cavities. (Report of A. Gougenheim, corresponding editor, Paris.)

Cozzoli^o, of Naples, ⁵⁷ in a long article, discusses the operative technique and the instruments applicable in the diseases of the sinuses of the nose. The following are the principal points touched upon: For the maxillary sinus he employs perforators; for the alveola, small Volkmann spoons, a syringe, an insufflator for antiseptic insufflations, and sounds for injections, which should always be lukewarm. In the frontal sinus a small curved spoon is used for sounding and curetting. The essential point recommended is to open well the septum which separates the sinuses, and enlarge the communication between the sinus and the nasal cavity. To open the anterior ethmoidal sinus, a sound ending in a spoon-shaped extremity on one end and a pen-point on the other may be employed. The distance from the point of the nose to the frontal sinus should be marked upon the sound. The author has also constructed special curettes for the removal of osseous sequestra. For the sphenoidal sinus a sound one and a half millimetres in thickness and fifteen centimetres long, with a curved extremity, is recommended.

Antrum.—Hajek, of Vienna, ⁵⁷ reviews the situation in a thorough manner, and accepts with doubt many statements that have been made on the subject of exploration and treatment of the accessory cavities. He considers examination by introduction of the probe into the antrum as of great advantage, but the instrument cannot be introduced in all the accessory cavities, as some authors state. Irrigation of the antrum he considers of little other than diagnostic value, while transillumination for him serves but little purpose, if any. A number of cases are reported in which the author demonstrates his appreciation of radical measures, scraping, etc., for the treatment of the disorders in question. Regarding transillumination, Milsom, of Marseilles, ⁴⁶ describes a case of supposed antral trouble in which the lamp gave negative information concerning the presence of pus; a carious molar being extracted, notwithstanding the symptomatic evidences were found to have misled the operator. The antrum proper was free from all discharge. In the discussion following the reading of the paper, Raulin quoted Wiebe, Schech, Freudenthal, Walter, Heymann, Ziem, Vahsen, Srebny, and Lichtwitz as according but little value to transillumination as a means of diagnosis, and for the following reasons: 1. When the pus has been evacuated the

diagnostic absence of transparency persists, indicating that this does not depend upon the presence of the pus. 2. In healthy individuals translucidity of the antrum is sometimes not obtained. 3. In some cases of unilateral empyema both sides of the face are transparent, indicating that the presence of pus may not influence the degree of transillumination. Altogether, the method cannot be considered as an infallible one, but methods of any kind possessing all the requirements for the attainment of perfection are, indeed, few. W. Robertson, of Newcastle-on-Tyne,¹¹ in an able paper on the subject, demonstrates that it represents a valuable addition to our armamentarium.

Empyema.—Lichtwitz, of Bordeaux,²⁸⁶ after dilating upon the rarity of bilateral empyema of the antrum, reports twelve cases, and expresses his belief that if more are not generally reported it is on account of the obscurity of the symptoms and of deficiency of methodical examination, a misleading feature being the likelihood, when both sides are involved, of ascribing the disorder present to the nasal cavities. In unilateral empyema the one-sided symptoms give a clear clue to the location of the trouble. The author advocates the middle meatus tapping method. He operated one hundred and eleven times in this manner, each puncture being followed by washing. The latter gave a positive result forty-three times. Among several others in whom no pus presented itself much benefit was obtained.

Fürst, of Leipzig,¹⁵⁸ reports a case of empyema of the antrum, caused by gonorrhœal conjunctivitis, propagated through the lachrymal duct. T. Middlemass Hunt¹⁸⁷ finds the so-called classical symptoms—(1) distension of the antrum, (2) swelling of the cheek, (3) infra-orbital pain, (4) escape of pus on lying on the sound side—to be usually conspicuous by their absence. The one constant and all-important symptom is the presence of a purulent nasal discharge coming from the concavity of the middle turbinate, and escaping either by the anterior or the posterior naris. Pain is, as a rule, present, and is generally intermittent in nature and supra-orbital in position. As regards the intra-nasal condition, diffuse hypertrophy of the middle turbinate, polypoid degeneration or even true polypi in the middle meatus, hypertrophy of the mucous membrane in the neighborhood of the hiatus semilunaris, and bare bone in the middle turbinate or at the ostium maxillaire

are to be found in most cases. He regards it as justifiable to open the antrum in any patient with unilateral purulent discharge coming from the concavity of the middle turbinated in its anterior half, and constantly or at times ill-smelling, if there be no obvious cause for the discharge inside the nose itself, such as a foreign body or specific ulceration.

Luc, of Paris,³⁷ observed two cases in which the etiological factors of empyema were not connected with the teeth. In the first case the disorders were ascribed to the organs of generation, the patient having been operated upon for salpingitis. Cartaz, of Paris,³⁸ cites two cases which had proved rebellious to irrigations. In each, former treatment by himself or others had given amelioration only; so he opened the sinus freely from the alveolar border, studied the interior by means of an inserted electric light, and dealt surgically with the morbid conditions within by dividing septal bands, removing all outgrowths and curetting away diseased lining membrane when pyogenic in character. In each case early cure was obtained, which has now persisted a year or more in evidence of its permanence.

Chiari, of Vienna,³⁹ has recorded twenty-one cases recently treated by him, and states his experience of the plan of plugging the cavity of the antrum with iodoform gauze, as recommended by Schech. From his cases he draws the following conclusions:—

1. In rare cases caused by periostitis of the root of a tooth the empyema may be cured by the extraction of the tooth.
2. Frequent nasal irrigations may cause a considerable amelioration of the symptoms.
3. Injections into the antrum, performed regularly and carefully, often do not bring about a cure, although usually they improve the condition.
4. It is only in recent suppurations that a few injections are likely to effect a cure.
5. Systematic injections are only made with ease and comfort through an alveolar opening, while if made by the opening from the inferior meatus they cause pain, and are difficult for the patient to manage himself.
6. Insufflations of powdered iodoform do not give satisfactory results.
7. The opening from the antrum into the mouth should be kept closed during the course of treatment.
8. The most satisfactory results were obtained by plugging the cavity with iodoform gauze (50 per cent.), for it rapidly dries up the discharge.

Further, it need not be done oftener than once a week, and it can easily be managed by the ordinary medical attendant. 9. In order to introduce the gauze plug it is necessary to drill a hole from four to six millimetres through an alveolus. The opening through the canine fossa is only made when the patient refuses to sacrifice a tooth, or when it is wished to scrape the cavity.

Schech, of Munich,³⁴ states that maxillary disease is usually unilateral, rarely bilateral. As general etiological factors he cites fractures, foreign bodies, and propagation of inflammatory processes from the nasal cavity. Purulent discharge is the principal symptom. Sounding and puncture are of use in the diagnosis. In the treatment, liquid injections give the best results, though it is necessary at times, of course, to have recourse to surgical intervention, as the opening of an alveolus, if the affection be of dental origin, etc. The best astringents for the washing out of open cavities are tannin, borax, carbolic acid, and particularly a 1-to-5 solution of aluminum-acetico-tartaratum. This last has, in the author's hands, brought about complete recovery in cases treated for months without success by other methods.

Hauer, of Nuremberg,³⁴ distinguishes two forms of suppuration of the antrum, one causing the classical symptoms,—infiltration of the soft parts, tumefaction of the jaw,—and the other more latent. The causes of this latent form are traumatism, foreign bodies, and nasal or dental affections. The symptoms are headache, generally periorbital, on the affected side, presence of pus in the nasal passages, etc. These symptoms, however, are not sufficient for diagnostic purposes.

Ziem³¹² recommends the use of cantharidate of collodion in nasal diseases, especially those of the antrum of Highmore.

Hunter Mackenzie, of Edinburgh,² reports the case of a woman, aged 23, in whom true ozæna existed. The antrum of the same side was found affected, and opened by an alveolar puncture and drained. This procedure cured the intra-nasal discharge of free pus, while Mackenzie treated the ozænatous condition by what he terms "canthos cotton." He refers to the rarity of the above coincidence, and eulogizes the efficacy of the continuous irritation provoked by the cantharides in the treatment of ozæna.

Heymann, of Berlin,³⁰ showed to the Berlin Laryngological Society a preparation of the antrum of Highmore. In a section

which included the lachrymal canal it was seen that this orifice ended in a sort of *cul-de-sac*. This fact is important from two points of view: 1. In sounding the lachrymal canal, it is necessary to pass the sound into this *cul-de-sac*, which is separated from the antrum of Highmore by a bony wall. 2. In performing the operation of Mikulicz and Krause, if the antrum of Highmore be opened according to the indications of these authors, the *cul-de-sac* will be entered as well.

Valuable reviews of the subject of empyema of the antrum were published by Dundas Grant,¹¹; A. Brown Kelly²¹³; R. Levy, of Denver, Col.¹⁵⁵; Hal Foster, of Kansas City^{82, 279}; and W. Cheatham, of Louisville,¹⁰ with report of cases.

Zarinko, of Berlin,⁶⁰ reports a very interesting case, probably the first on record. The patient, a woman 50 years of age, complained of foul breath, which was found to emanate from the nostrils. The presence of nasal polypi being ascertained, they were removed. Syphilitic cicatrices were present on the palatal vault. The fetid odor continuing, Zarinko irrigated the left antrum, bringing away small masses of dark material about the size of a pea. Microscopical examination of these masses showed them to consist of *Aspergillus fumigatus*, thus creating a newly-recognized disorder,—mycosis aspergillica of the antrum. Malignant growths of the antrum were reported by W. Knight, of Cincinnati,⁵³ and in the subsequent discussion by B. M. Ricketts, G. B. Orr, and G. W. Ryan, of the same city. G. F. Shiels, of San Francisco,¹⁴⁷ reported a case which appeared to be one of colloid cancer of the antrum.

Frontal Sinus.—Helly^{226, 2} gives an account of nine cases of frontal pneumatocele, one of which he had observed himself. They occurred in patients of different ages. One was in a boy of 12 years. Before this age the disease could not well occur, since the frontal sinuses are developed at the termination of the first decade of life. Six cases were males, two were females, and in one the sex was not recorded. The principal etiological factors in the production of the disease were traumatism of some kind and suppuration. In the author's case both these factors were combined. In some cases congenital deficiencies of the bone in the walls of the frontal sinuses were the predisposing causes. In others the existence of small vascular foramina, through which

blood-vessels in the exterior walls of the frontal sinus protruded, played an important part in the production of the disease. Four hundred and seventy-four skulls of individuals over 14 years of age were examined in the Anatomical Institute of Graz, and in four of these foramina were found to exist. If inflammation take place in these foramina, the vessels become thrombosed, and a point of diminished resistance is produced. If forced expirations take place, the mucous lining of the frontal sinus is liable in time to be forced through and a frontal pneumatocele produced. In a similar way an air-containing tumor is produced in congenital cases. The diagnosis is easy, the tympanitic percussion-note and the increased size of the tumor during forced expiration being characteristic. As regards treatment, various methods were adopted. Puncture and subsequent pressure cured one case. Incision, evacuation of contents, insertion of a drainage-tube, and healing by granulation cured others. In congenital cases, closure of the aperture by transplantation of periosteum or a bone plastic operation effected a cure. In the author's case healing was brought about by an attack of erysipelas.

Winckler, of Bremen,³⁴ describes the symptoms of empyema of the frontal sinus, the difficulties of diagnosis and its methods,—e.g., illumination, rhinoscopy, and examination by the probe. Concerning the introduction of the probe, he has found that it is not so easy as many authors believe, because the entrance to the frontal sinus varies greatly in length and relation to the circumference. Experiments upon cadavers show that it is sometimes nearly impossible to find it. A cure of an empyema of the frontal sinus by irrigation *per vias naturales* is nearly impossible. The author, therefore, recommends the perforation of the anterior wall of the sinus, as described by Schaeffer, and he then uses insufflations of iodoform. The inflation of air by the method of Politzer he does not apply. Of sixty-two patients treated by Schaeffer's method, forty have been cured. In a case seen by Sacchi, of Genoa,⁵⁰⁵ the superior orifice of the naso-frontal canal could not be found after a sharp attack of empyema. He therefore made a new aperture by means of a cranial perforator. After a little trouble caused by the presence of small polypoid masses, the passage was found to have become quite permanent, and the functions were properly restored. Steinthal, of Stuttgart,¹³⁸ in

empyema of the frontal sinus, when the mucous membrane is completely degenerated and the cavity of the sinus is not too large, completely resects the anterior wall, in order to evacuate the pus and prevent recurrence. Cases of empyema presenting clinical interest were reported by Emory Lanphear, of Kansas City,⁷⁶⁰ and Gallemaerts, of Brussels.⁸⁸⁸ Poppert, of Munich,³⁴ reports the extirpation of a large osteoma of the frontal sinus, causing exophthalmos and pressure within the cavity of the skull. Complete recovery was obtained.

Ethmoidal Cells.—J. H. Bryan, of Washington,³⁹, related the history of a case of suppuration of the ethmoid cells, terminating in caries, and illustrating the condition described as rhinitis caseosa. The patient gave a history of having suffered from caries of an upper molar tooth. In July her nose became closed; the secretions, at first watery, became thick and fetid. There was pain over the bridge of the nose, extending along the infra-orbital ridge to the temporal region. Severe headache, pain on pressure of the eyeball, and a crepitating sensation under the orbit were present. On the left side of the nose two mucous polypi were seen attached to the anterior extremity of the middle turbinate bone. After snaring off the polypi, the thick, caseous secretion was observed to come from both the middle meatus and from above, between the middle turbinate body and the septum. On examination with the electric light the left antrum appeared opaque, showing this to be complicated with the inflammation of the ethmoid cells. In spite of treatment, the conditions grew worse until, on her way to his office, the abscess discharged spontaneously a great quantity of thick, caseous secretion, after which the pain ceased and the general health improved. The complications of suppurating ethmoiditis more frequently met with were abscess of the antrum, abscess of the orbit, and meningitis. In the above case the antral complication was purely accidental, dependent upon a carious tooth.

E. Woakes, of London,², published a paper on the pathology and diagnosis of "necrosing" ethmoiditis, in which the results of a microscopical examination of specimens of diseased middle turbinate bone, twenty in number, are given. Hitherto the diagnosis of ethmoiditis has been considered in connection with gross and manifest changes in that process or wing of the ethmoid known as the middle spongy bone; but an almost equally exten-

sive class of cases exists, the author states, in which no such external indication of the disease is present. In these the middle spongy bone shows no departure from the normal, except perhaps in looking redder and of less even surface than usual. The necrosis will, in such cases, be found in the walls of the ethmoid cells, which are frequently partly broken away, so that the probe grates against the detritus and enters one of the ethmoidal cells. Here the necrotic process may not extend beyond the nasal wall, though it may not rarely be detected in the depths of the cell-structures of the bone. An appeal to pathology shows the necrosis to be the final event in a series of morbid changes which, beginning with fibrosis, goes on to obliteration of arteries, absorption of bone, the development of cysts and of polypous and granulation tissue, until finally interstitial death of the bone takes place. The starved bone breaks up into minute areas of dead matter, which, until removed by the art of the surgeon, constitute a source of constant irritation, just in the same way as does a decayed tooth or a carious astragalus. In conclusion, he believes that the designation "necrosing ethmoiditis" will be found to be amply justified.

Sphenoidal Sinus.—J. J. Clarke, ² showed a sphenoidal bone which had been taken from the body of a boy aged 13. It contained a very large sinus, and in the anterior part of the sinus there was a small myxomatous polyp. There were also present adenoid growths in the pharynx. Some two or three months previous to his death the boy had sustained a compound fracture of the frontal bone, from which he had apparently completely recovered. Two months after the accident he began to have attacks of epistaxis, which increased in frequency, and in one of which he died. At the post-mortem examination the sinus in the body of the sphenoid bone was found full of clot, and communicated directly with an opening in the left carotid artery. No trace of any fracture of the base of the skull could be found, nor was there any spicule of bone touching the artery. The author thought, however, that most likely the arterial wall had been scratched at the time of the accident, and a small aneurismal dilatation had formed there which finally gave way. Scanes Spicer had only been able to find one case, recorded by Zuckerkandl, of a myxomatous polyp of the sphenoidal sinus. The same writer also referred to the extreme

thinning of the sphenoid bone which might occur, even to its becoming cribriform; so that the mucous membrane of the sphenoidal sinus was in actual contact with the dura mater.

Schaeffer, of Bremen,¹⁰⁰ reviews the symptoms after an experience based on the examination and treatment of nineteen cases of acute and fifty-three of chronic empyema of the sphenoidal sinus, expresses the opinion that this affection is much more common than is generally thought. In acute cases the patient suffers from headache and vertigo, and feels a pressure over the eyes, due to propagation of the inflammation from the nasal mucous membrane or a genuine disease. The objective examination reveals a protrusion of the anterior walls of the sinus, but no abundant secretion and no dried secretion. After cocainezation of the nose, the cavity can be opened by the introduction of a probe through the natural opening, or by the sharp spoon. After thus dilating the aperture a mass of mucus and pus can often be removed, with great improvement in the condition of the patient. Chronic inflammations of the sinus are often combined with nasal polypi. The author believes, in opposition to Grünwald, that in cases of ozæna the ozæna is primary, and the disease of the accessory cavities secondary. In cases of chronic suppuration the subjective symptoms are vertigo, discharge of pus, fœtor, psychical depression, disturbances of vision, and a feeling of oppression. The objective symptoms are broadness of the nose, erysipelatous redness of the nose, hyperplasia of the nasal mucous membrane, pharyngitis sicca, polypi, and hypertrophy of the tonsils. The treatment consists in opening the sinus with a sharp spoon, dilating by the bone-forceps, and after-treatment with antiseptic irrigations and insufflation of iodoform powder.

INSTRUMENTS.

The nasal douche seems to have attracted considerable attention this year, and, while its merits and demerits have been freely discussed, the elements of danger to the aural apparatus seem to have brought all writers on the subject to a common accord. Numerous directions are given, but, since these have to be followed by the patient, the instrument, though extremely useful, will still continue to furnish quite a respectable proportion of cases of otitis. Among the papers on the subject may be mentioned those of L. A. Dessar, of New York¹⁰¹; F.

Suarez de Mendoza, of Angers¹³⁶; Percepied, of Mont Dore,¹¹ and Tissier, of Paris.²¹² Substitutes are proposed by Dundas Grant¹¹ and Bloebaum.³⁹⁹ The former devised a double-current nose-piece, the tube of exit lying in the centre of the tube of entrance. Any resistance in the nasal cavity will thus cause the fluid to find its way back through the exit tube. Bloebaum twists a long and thin roll of cotton on to a knitting-needle, introduces it into the nose, and withdraws the needle, leaving the cotton in the nose. A second and third are introduced thus, until the entire cavity is filled. In the course of a quarter of an hour the mucous membrane begins to secrete profusely, and if the cotton be then removed it will be found that it is saturated with secretions, and the crusts lie on the rolls of cotton, thus leaving a nicely-cleansed cavity for the application of the remedies. He never employs watery solutions.

An atomizer in which all parts in contact with the solution are made of glass—a feature of importance in the use of many preparations—is described by Moure, of Bordeaux.¹⁸⁸ A “simple bottle-inhaler,” based on usual principles, is contributed by W. Scheppegrell, of New Orleans.⁹

Modifications of the nasal speculum were introduced by several inventors. H. N. Spencer, of St. Louis,⁹ placed parallel blades on a double-threaded screw, causing them to separate or come in contact by turning a horizontal thumb-screw. The external portion of the instrument curves downward, thus enabling it to rest on the upper lip, making the speculum self-sustaining. Moure, of Bordeaux,¹³⁶ by cutting an ordinary funnel speculum in two lengthwise and mounting the sections on a screw-slide, obtains the same results. Ragoneau, of Dijon,¹³⁶ constructed a small but long duck-bill speculum calculated for deep exploration of the cavities. Finally, Wade, of London,⁶ contributes a combination eye-lid separator, and aural and nasal speculum, consisting of a spring sugar-tong-like bow, to the ends of which the blades of the different instruments mentioned may be attached.

Bucklin, of New York,⁹⁹ contributes a solid-looking saw mounted on an aluminum handle of sufficient size to give the operator a firm hold. Three reversible blades are supplied, each being designed to overcome special difficulties. A convenient rapid-working snare, combining the most advantageous features of

instruments known, was devised by M. J. Asch, of New York.¹ The same author,²⁰ devised a perforated hard-rubber tampon, for use after septal operations, to hold the parts in position. J. O. Roe, of Rochester,²⁰ contributed an improved Adams forceps, and Rousseaux, of Brussels,¹⁹ a sliding gouge, mounted in forceps for nasal spurs. The latter being engaged in the fenestra of one of the blades, the gouge is slid along, and as it works guillotines the growths. J. W. Cousins, of Portsmouth,²⁸ describes a new nasal clamp-forceps, the blades of which are serrated longitudinally over one-half of their surface, while the other half is sharp at the edge, thus making the instruments available for many purposes.

Nasal scissors, with small blades replacing those of the ordinary crocodile forceps, were presented by W. J. Walsham, of London.⁶ Chevalier Jackson, of Pittsburgh,⁵⁰ contributes a tongue-depressor, combining the desirable features of other instruments, and¹¹ some galvano-cautery electrodes, dispensing with thread-winding and substituting hard-rubber vulcanized on their surface, thus procuring better isolation and more cleanliness. The same aim is accomplished by L. A. Dessar, of New York,¹¹ by means of asbestos and ivory. They can thus be soaked in anti-septic solutions without damage. H. W. Loeb, of St. Louis,⁶¹ modified the galvano-cautery snare, presenting the advantages of requiring less ampèrage than other snares on account of the short pieces of platinum utilized, and in that the shaft is insulated with hard rubber.

Vulpius, of Erfurt,³² describes a new nasal cautery, consisting of a crescentic piece of platinum wire attached to the free ends of two thicker copper wires. The latter being sufficiently apart at the end to enable the instrument to be passed over an ordinary nasal growth, the platinum blade burns its way through while being drawn home on closed circuit. A combined post-nasal spray and palate retractor was described by W. P. Brandecker,⁵⁹ and a nasal ointment introduced by William Gayton, of London.² French, of Brooklyn,¹ contributed a device to prevent mouth-breathing during sleep. This consists of a thin piece of "washblonde," which is attached to straps of light webbing and adjusted to the head.

DISEASES OF THE PHARYNX, NASO-PHARYNX, TONSILS, AND SOFT PALATE.

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TONSILS.

Anatomy.—Harrison Allen, of Philadelphia, contributes a highly valuable article entitled “The Tonsils in Health and Disease.” He discusses in a scholarly manner the views of the best authorities concerning the tonsillar crypts, and calls attention to numerous variations in the form and arrangement of the follicles, hitherto undescribed. In order to obtain the best results in the treatment of diseased conditions of the gland, it is urged that these variations be kept in mind, and that, instead of the indiscriminate removal of the tonsil, such treatment be employed as shall best meet the case in hand. Incision of the tonsil should be in the direction of its growth, and not transverse. With regard to abscission, the author believes that it should be restricted to the removal of hardened cortex, and that if diverticula exist they should be freely opened.

Cysts, acute and chronic abscesses, and foreign bodies of the tonsil are each considered in turn, and the following conclusions reached: That the existence of a large pocket or crypt at the lower part of the tonsil is common; that a mass lies above the thickened cryptose tissue, above the opening of the main pocket, and forms the velar tonsil; that the varieties of tonsil-form, as expressed in the paper, constitute the best guide to clinical study of the region; that the treatment of affections of the tonsil should be based upon structure; that this structure being of the character of recessions of mucous membrane from the general pharyngeal surface, attempts to restore such parts to their normal condition should be always borne in mind, and all canals or fistulous passages that are abnormal should be slit up; that closed tonsils should be opened; that incisions for the reduction of large tonsils should be in direc-

tions which harmonize with the plan of the region ; and that when such hints for the treatment of the tonsil are acted upon, the majority of the diseases of these glands are remediable. The paper is furnished with numerous original illustrations, which materially assist the reader to a clearer understanding of the author's views.

Tonsillitis.—Sokolowski⁵⁶⁹ describes, at some length, a condition of the tonsillar crypts which he calls "tonsillitis lacunaris desquamativa chronica." Microscopically, he found the walls of crypts strewn with small granules, which, properly magnified, were seen to be greatly hypertrophied folliculi, growing into the lumen of the crypts. There was great proliferation and desquamation of epithelium, and consequent plugging and irritation of the crypts, without hypertrophy necessarily being present. He discusses Fränkel's "angina lacunaris," which he identifies with diphtheria, from which it differs only by its milder degree, and proposes for it the high-sounding name of "tonsillitis lacunaris pseudomembranacea." Unfortunately, the above article is not abreast of the times, as will be seen by a reference to the admirable investigations of Park, in the section upon diphtheria, in this ANNUAL (vol. i, I-4).

Auché, of Bordeaux,⁷⁸⁰ studies certain complications of acute tonsillitis, especially the rheumatic, and believes that they depend primarily upon the tonsillar disease. The connection between tonsillitis and cutaneous eruptions is the subject of a paper by Le Gendre.¹⁷ He notes a case of tonsillitis, in a woman aged 33 years, in the course of which several successive eruptions of purpura and papular erythema appeared. They ended when the tonsillitis disappeared. The patient had mild fever, fugitive pains in the joints, and marked debility. He reports three other cases, in the first of which an erythema multiforme appeared on the fourth day of a follicular tonsillitis ; in the second, a month had elapsed before the appearance of articular pains and purpura, the patient having been in a very debilitated condition in the interim. The third case was that of an attack of tonsillitis which appeared between two eruptions of erythema polymorphum. Le Gendre urges the investigation by bacteriologists of the connecting link between tonsillar and cutaneous manifestations.

Joal, of Mont-Dore,¹³⁶ reports three cases in which purpura followed acute tonsillitis. The characteristic spots appeared twelve,

six, and eleven days after the onset of the tonsillitis. Four other cases are also referred to. The method of the production of the purpura is said to be intoxication by soluble poisons or toxins, but Joal was unable to investigate the pathogenic agents, either in the tonsillar products or the purpuric spots.

Hypertrophy.—McGuire⁹,₁₄ reports a case of acute parotitis in a poorly-nourished child of 8 months, in which the tonsils became so much enlarged that the child could not breathe and tracheotomy was required. Death ensued. The author calls attention to the rarity of inflammation of the tonsils appearing secondarily to inflammation of the parotid gland. Kitchen, of New York,⁴⁵¹,₁₄ advocates tonsillotomy in the early stages of quinsy, to abort the attack and prevent succeeding ones. He has found this method successful.

Pollard, of London,²,₁₄ suggests the value of Borelli's method of enucleating the tonsils. The child should be anæsthetized, and, by means of the finger, the tonsil torn away from above downward until it hangs by a small pedicle at its inferior aspect, which may be separated with scissors. He also reports two cases of arterial hæmorrhage, after tonsillotomy in children, checked by ligature of the bleeding arterioles. Rattey, of New Brunswick,²,₁₁ reports a case of somewhat severe hæmorrhage in a male, aged 20 years, checked by pressure and styptics. Hovell, of London,²,₁₁ controlled bleeding in a girl of 20 years, by first cleansing the bleeding surface, and then pressing tannogallic-acid paste against it, as recommended by Morell Mackenzie. He has always found this plan effective.

Shannon, of Kent, ²,₁₄,₁₀₇₆ refers to two cases of fairly severe hæmorrhage in adults, and calls attention to the risk attending activity on the part of the patient after the operation, urging that, after tonsillotomy, quietude for several hours should be enjoined. Although this is not a new suggestion, it is one of sufficient value to warrant frequent repetition. Nash, of Bedford, ²,₁₄,₁₈ removed, with a bistoury, the tonsils of a hæmophilic girl, aged 21 years, who bled severely for four hours, in spite of pressure, styptics, and the internal use of ergotin. Syncope finally supervened, after which, 3 pints (1½ litres) of a warm saline solution having been injected into the rectum, the pulse rapidly improved and the bleeding ceased and did not recur. The case illustrates the danger

of performing any operation upon a bleeder, and the value of saline rectal injections in refilling the empty blood-vessels.

The following case and discussion are of such unusual interest that they are given *in extenso* :—

Arbuthnot Lane¹ related a case of a man, aged 21 years, who had his tonsil removed on December 16th. At the time of the operation and during the few hours following he lost about half a pint of blood; on December 19th he lost another half-pint; bleeding recurred on the evening of the 20th, and continued steadily, in spite of local applications. On December 22d, as he was evidently dying, his friends consented to his removal into Guy's Hospital, a distance of only a few yards, and he was carried directly into the operating theatre from his house on a stretcher. Normal salt solution had to be introduced freely into the circulation before any other operation could be done. He reacted at once to the injection, when Lane tied the common carotid. It was not necessary to inject more than 4 pints (2 litres) of salt solution, his pulse being then 96, large and full. He left the hospital within a few days, quite well. The point of interest about the case, besides the perfectly successful result of the saline intra-venous injection, was the delayed onset of the bleeding, which recurred more than four whole days after the excision of the tonsil. On carefully examining the excised area after the operation, as the patient's condition did not admit of it before, no evidence of any injured vessel could be seen. The tonsil had been very freely removed, but probably not more so than was very commonly done. There was nothing in the man's history, or in the behavior of the wound at the time of the operation, which suggested that he bled more readily than other people. Harrison Cripps, in the discussion, did not consider the operation that had been performed the one that should be generally adopted for haemorrhage about the mouth and tonsil. The mortality following ligature of the common carotid for haemorrhage was very high, and was not due to ordinary surgical complications, but to dangers arising from the ligature of this particular vessel. About 30 per cent. of the fatality arose from brain-symptoms, the result of interfering with the circulation through the internal carotid. In a considerable number of the remaining cases, the ligature of the common carotid had failed to check the bleeding. It would seem that, after deligation

of the common carotid, the blood-stream through the internal carotid was reversed, so that it passed down this vessel and into the external carotid, and thence out from the wounded vessel; and it also should be remembered that the free communication between the superior and inferior thyroids was not interrupted by a ligature of the common carotid. In the paper to which he had alluded he had said that in wounds about the tonsil it almost invariably happened that the bleeding came from a branch of the external carotid, wounds of the internal carotid through the mouth being of extreme rarity. In haemorrhage such as that met with by Lane, where pressure was impracticable, the external, rather than the common, carotid should be tied. Ligature of this vessel did not interfere with the brain-circulation; so that the risks from that cause were avoided. The ligature should be placed between the superior thyroid and the lingual; there would then be no risk of the bleeding recurring from the wound, from blood brought either as a regurgitant stream from the internal carotid, or through the thyroid anastomosis. The fear of secondary haemorrhage after ligature of the external carotid, owing to its numerous branches, was chiefly theoretical, for it only occurred in a single instance in thirty cases recorded by Guyon. Hulke agreed with Cripps as to the preferability of ligature of the external, rather than the common, carotid artery for tonsillar haemorrhage; but thought that Lane had consulted the safety of his patient by adopting that operation which took least time. Lane, in reply, said the reason why he had tied the common carotid was that, upon his excision exposing the external and common carotids, he found a very large pharyngeal artery present, and that other branches of the external carotid arose close to that vessel. He had often ligatured the common carotid, and had never known subsequent cerebral trouble arise. This immunity he attributed to the fact that he always injected the saline solution, the desirability of which procedure he strongly advocated.

Syphilis.—Colombini, of Sienna,⁵⁸⁹ reviews the subject of chancre of the tonsil and reports two cases: one in a female of 45, cause unknown; the other in a soldier, aged 33, probably contracted from a comrade's pipe. Cartaz, of Paris,⁵⁹⁰ reports three cases of chancre of the tonsil, and one of chancre of the soft palate contracted from an infected tobacco-pipe.

Calculus.—Viali ²²² removed from the tonsil of an infant a calculus weighing 1 grammme (15*½* grains). It was composed of carbonate and phosphate of lime and of organic matter.

Tumors.—Baker, of Brighton, ¹¹, was obliged to operate several times for the removal of the tonsils of a lymphadenomatous girl, aged 14, in whom the tonsillar hypertrophy repeatedly recurred. The cervical, axillary, and inguinal glands are also enlarged. The patient died of pneumonia. The day before her death all of the enlarged glands disappeared.

McBride, of Edinburgh, ², describes two forms of cyst of the tonsil; one common, the other rare. In the former the cyst is small and superficial and the wall delicate; in the latter it is large and deep and the outer wall is of some thickness. Treatment of the latter should consist in the removal of the outer wall and the cauterization of the rest of the cavity. The latter form is decidedly rare. Batho, of Jersey, ², reports a case of deep cyst, similar to that described above, while Stewart, of London, and Luke, of Barnes, S. W., ², cite cases apparently of the simpler variety.

Lejars, of Paris, ³⁸⁰, saw four cases of tonsillar polyp. He considers that these growths are either of the nature of cavernous fibromata or simply adenoid. [It would be interesting to know in how many cases the above diagnosis could be explained upon the anatomical grounds given by Allen.—Ed.]

The most valuable contribution to the study of new growths of the tonsils is by Newman, of Glasgow, ⁵, who reports ten illustrative cases and gives statistics and bibliography up to date. The statistics of sixteen cases are as follow: 1. Spindle-celled sarcoma; operation; no recurrence for five years; then recurrence and death. 2. Lympho-sarcoma; death in five months. 3. Carcinoma following gumma of tonsil. 4. Epithelioma; death in three months. 5. Epithelioma; death in six months. 6. Epithelioma; time not given. 7. Epithelioma, following syphilis. 8. Epithelioma; operation; no recurrence after nineteen months. 9. Epithelioma; death in eighteen months. 10. Epithelioma; now under observation. By far the most common of the sarcomatous variety of tonsillar tumors is the round-celled, or lympho-sarcoma, a virulent disease in which secondary formations rapidly develop. The prognosis in this variety is bad. The spindle-celled variety

may remain encapsulated for a long while, and may be capable of complete removal. In 52 cases of sarcoma 27 were round-celled, while in 20 the variety was unknown. Of 92 carcinomata 24 were epithelial. As to prognosis, "in very few forms of malignant disease has operative treatment been less successful than where the tonsil has been primarily attacked." Of 144 cases collected 56 underwent operation; with what success is not related. In the remaining cases the disease had advanced too far to warrant interference. Still, in a few cases it has been found possible to remove the disease and give the patient an extension of life. Early diagnosis and easy operation are of the first importance in securing the best results. Incomplete methods of removal are condemned. The only question of consideration, the author believes, is the relative merit of removal by the mouth, or by external incision. McEwen removed two carcinomata of the tonsil; in both the patients were, respectively, well two and twelve years afterward. Besides these, there are only four cases in which recurrence in the tonsil did not take place after the operation. In two of these recurrence took place in other parts. The statistics of sarcoma are better as to palliative treatment. An antiseptic mouth-wash or spray, every two or three hours, is recommended, and local applications of iodoform and ether, alcohol, eucalyptus, and of sodium salicylate are recommended. By such means the progress of the disease is delayed and comfort secured. For the haemorrhage which occurs commonly in round-celled sarcoma a solution of antipyrin, 1 in 50, may be used.

O'Hara, of Melbourne, ²⁸⁵ Aug. 15 successfully removed from a man a sarcoma which involved the tonsil, parts of the base of the tongue, and the left half of the soft palate. The cervical glands were not indurated. In operating, after preliminary tracheotomy, an incision was made from the angle of the mouth to the edge of the masseter muscle. The tonsil was first pressed inward from without, and drawn inward as well, by means of a strong vulsellum forceps, and then the diseased mass was carefully dissected away. Haemorrhage was severe. The thermo-cautery was freely used, to destroy any remnant of the growth, and the cheek wound dressed. The latter healed by first intention, and the tracheotomy tube was removed in fifty-six hours. The patient continued well for four years, and died from recurrence of the disease in the lung. The

author's operation occupied twenty minutes, in which time he removed the structures mentioned more easily and quickly, as he believes, than could have been done by Mikulicz's method.

Gardiner, of Adelaide,²⁸⁵ removed a sarcoma of the tonsil from a man aged 62. Recurrence took place in the axilla at the end of a year. Luc's case¹¹ well illustrates the difficulty of early diagnosis in tumors of the tonsil. A man of 50, in poor health, had a swelling of the tonsil for two months, without glandular enlargement. Microscopical examination of fragments simply showed hypertrophy. Two months later another piece was examined, with negative results. Two months after this there were glandular enlargement, dysphagia, and lancinating pain. Microscopical examination revealed lympho-sarcoma. Such experiences, unfortunately, are all too common. [The above reports are welcome additions to the subject. It is impossible to emphasize too strongly the necessity for more complete statistics as to the results of operations for the relief of malignant disease of the pharynx and larynx. The aggregate number of such operations now annually performed is very considerable. The need for full information concerning them is pressing, and it is hardly too much to say that the withholding of it is a disgrace to surgery.—Ed.]

PHARYNX.

Mycosis.—In an exhaustive article upon pharyngo-mycosis, Hemenway, of Chicago,¹¹ gives a full bibliography of the subject and discusses its pathology at length. As against the theory that the condition is due to the *leptothrix buccalis*, he calls attention to the fact that, while the *leptothrix buccalis* is made up of rod-like filaments, the organisms which he has found in mycosis, and which have been found by others, are directly branching, more after the fashion of the *cladothrix* genus. Again, if mycosis be the result of *leptothrix*, why is it not more common? Why does it not occur upon the gums, as well as in the pharynx? The presence of *leptothrix*, he maintains, is not sufficient evidence that it is the cause of the mycosis, as *leptothrix* is commonly found in the mouth; and he believes that the essential variety of micro-organism is one which he calls the *bacillus fasciculatus*, and neither the *leptothrix* nor the *cladothrix*. Nothing new as to treatment is suggested.

Knight, of Boston,¹, states that he has found no satisfactory

method of treatment except galvano-cauterization of the affected follicles. In the discussion of the paper Delavan advocated the careful use of the cautery, frequent spraying of the throat with solutions of borax and of bichloride of mercury, and careful attention to any error of digestion present. Johnston, of Baltimore, called attention to the frequency with which the affection was found among debilitated children and old persons. Robinson, of New York, suggested the value of treatment at a sulphur spa.

Nabias and Sabrazès, of Bordeaux,⁷⁰ call attention to the destructive action of the chloro-iodide of zinc upon the leptothrix buccalis, and suggest it as a cure for pharyngo-mycosis. Dubler, of Basle,²¹⁴ reports a case in a boy of 8 months.

Abscess.—Pollard, of London,⁶ has seen four cases of retro-pharyngeal abscess in infancy. In an institution treating fourteen thousand children a year, he has only seen three cases in five years. All of the four cases reported by Pollard were operated upon by external incision, after Chiene's method; all recovered, the abscess-cavity closing quickly. In each case the abscess was purely local, with no relation to spinal caries; in none was the tonsil the seat of the abscess. The observations which accompany this valuable paper are well worthy of study. Cases of pharyngeal abscess in infants are also reported by Brook, of Swansea,⁶ who presents two cases; Carless, of London,⁶ one case; Mowat, of London,⁶ one case; and Casadesus,⁶³ three cases. Witthauer, of Halle,³⁴ lost a patient, aged 32, who had a large swelling in the pharynx, most marked upon the posterior pharyngeal wall. Pressure on the left side of the neck was painful. Oedema glottidis attended with severe dyspncea came on; some hours later extreme cyanosis and urgent dyspnœa; tracheotomy; death. The post-mortem showed an abscess in the vertebral column, beginning in the retropharyngeal space and pointing in the region of the sixth tracheal cartilage. Its cause was not discovered. The author believes the case to have been one of cryptogenetic septicæmia.

Kramer⁸³⁶,² advocates the view held by many modern surgeons, that an external incision in the neck is the preferable method of dealing with retropharyngeal abscesses of tuberculous origin. The old method of dealing with such abscesses by the mouth is attended with much risk, as it is impossible, with a wound freely exposed to the air, to prevent putrid infection of the suppurating

cavity, and tuberculous material may be carried into the air-passages and the gastro-intestinal canal. Moreover, the patient in many cases is troubled by a persistent fistula, and by long continued discharge of pus. An external opening in the neck, of sufficient extent to permit a strict antiseptic treatment of the tuberculous abscess, and a free application of iodoform, as has been shown by Chiene and Burckhardt, can be made without difficulty or danger. In a case reported by the author, an incision about three inches in length was made on the left side of the neck, between the larynx and the inner edge of the sterno-mastoid muscle. After division of the skin and the platysma, the deeper portion of the wound was opened up by blunt instruments until the wall of the abscess was exposed below and to the inner side of the carotid artery. The wall was then punctured by a director, and the sac, after it had been emptied of its fluid contents, was freely laid open, and its inner surface scraped. Finally, the exposed cavity was washed out with sublimate solution and plugged with iodoform gauze. The wound was quite healed by the end of the fourth week, and the patient, a girl aged $4\frac{1}{2}$ years, made a very good recovery.

Erysipelas.—Hall,² reports six cases of erysipelas of the pharynx and larynx. He found that applications of cocaine were particularly beneficial in relieving pain and contracting oedematous swellings.

Angina Ludorici.—Delorme,³ in an interesting paper upon this subject, advises that when the swelling is unilateral it is well to employ a deep lateral incision into the submaxillary region.

Ruault, of Paris,¹¹ describes a little-known variety of phlegmonous angina, which appears to be a superficial submucous phlegmon of the base of the tongue. He has seen 5 cases. It has always occurred with such marked individuality as to seem to constitute a distinct clinical type. In 4 cases out of 5 the disease was unilateral. In 1 case resolution was followed by a second attack and abscess. In 2 cases it ended in resolution and in 2 in suppuration. Phlegmonous lingual peri-amygdalitis may be easily differentiated from deep basic glossitis and from angina Ludovici. The absence of cervical adenitis will distinguish it from phlegmonous adenitis, and it could hardly be mistaken for abscess secondary to a bone-lesion. Its prognosis is good, the abscess tending to sponta-

neous opening. The first principles of treatment are deep scarification and early evacuation of pus.

Tuberculosis.—Herzog, of Würzburg, ⁵³ gives a résumé of primary tuberculosis of the pharynx, and reports a case in which, with two large ulcers, one upon the tonsil, the other upon the posterior wall of the pharynx, each about half an inch in diameter, cure was effected by thorough cauterization under chloroform by means of the Pacquelin cautery, followed by washes of a solution of potassium permanganate. The ulcers healed promptly and two years later had not recurred.

Tumors.—Raulin ⁴⁶ reports an interesting case of colloid cyst of the naso-pharynx, arising from the left nasal cavity and posterior part of the soft palate, the size of a pigeon's egg, which he destroyed by first removing with forceps and then cauterizing the base. Wagnier, of Lille, ¹³⁶ again calls attention to his galvano-caustic loop, and reports three cases of fibro-myxoma of the naso-pharynx successfully treated by this method. Boval ¹³⁶ removed a large naso-pharyngeal tumor by means of Goris's galvano-caustic snare, and a similar growth was removed by Binnie, of Kansas, ⁹, by means of the Jarvis snare. Capart, of Brussels, ⁸⁶⁸, adds another to the list of cases in which the electrolytic method was successful in removing a naso-pharyngeal fibroma.

McBurney, of New York, ¹ in the case of a large soft tumor with extensive attachments to the pharyngeal vault, first performed tracheotomy and gained entrance to the pharynx by an operation similar to Annandale's, and then thoroughly and successfully removed the growth. Primary union took place throughout, but on the fifth day sharp secondary haemorrhage occurred, which was stopped by partially separating the upper jaw and packing the pharynx with gauze. Recovery was rapid and complete. Debaisieux ⁵² cured three cases of naso-pharyngeal fibroma: one by resection of the superior maxilla, two by operations performed through the natural passages. A valuable discussion followed the reading of his paper. Roncalli, of Turin, ¹⁷, showed a tumor from a young infant, situated upon the anterior pillar of the palate, and pedunculated. It was covered with normal pilose skin and was formed of connective tissue and adipose. It was said to be the second case on record. [Several similar tumors have been found attached to the posterior aspect of the soft palate.—ED.]

Hæmorrhage.—Rosenthal, of Berlin,⁹⁸, describes the different causes and locations of pharyngeal hæmorrhage, and recommends for its relief the tannogallic mixture of Morell Mackenzie.

Heryng, of Warsaw,¹¹, reports six cases of pemphigus; and Cognacq, of Bordeaux,¹⁸⁸, and Wright, of Brooklyn,⁹, each one case of lupus of the pharynx.

ADENOID TISSUE OF THE PHARYNX.

During the past year a large number of articles have appeared upon the general subject of adenoid vegetations at the vault of the pharynx. Most of them have contained nothing new, but they have been useful in diffusing more widely a knowledge of this important condition. Several, however, have presented original observations of interest. Pilliet⁷ calls attention to the presence of giant-cells in hypertrophied adenoid tissue, similar to those of tuberculosis. John Dunn, of Richmond, Va.,¹, explains the causes of deafness in cases of adenoid hypertrophy, as follows: Repeated inflammation of adenoid hypertrophies in certain cases causes a sclerotic process which, when once started, does not cease as long as there remains lymph-tissue in the growths; its effects are not confined to the hypertrophies themselves, but a similar process may be determined by it in the adenoid stroma of the mucous membrane lining the Eustachian tubes and middle ear.

Lavrand, of Lille,¹⁸⁶, operated, under anæsthesia, upon a young girl of 13, for the removal of adenoid vegetations, and, having read that remnants left in the pharynx would atrophy, was not sufficiently thorough. Recurrence of the growth took place, the second mass being larger than the original tumor. This happened twice in one case and once in another, and is instructive as emphasizing the importance of complete removal. Martha¹²⁸ concludes, from two cases observed by him, that when a tracheotomy tube cannot be withdrawn without serious dyspnœa, not only the larynx and trachea, but the naso-pharynx, should be examined, since the presence of adenoid vegetations can, in such cases, cause laryngeal spasm. Complete removal of the growths in the cases reported by him entirely obviated the difficulty. Hopkins⁷⁷ found, in 268 children examined in New York, 63, or 24 per cent., with adenoid vegetations, associated with which were 32, or 50 per cent., of enlarged tonsils, and 29, or 46 per cent., of some

anterior nasal obstruction. Thompson, of Cincinnati, ⁵³ reports a case in which convulsions in an infant were permanently cured by the removal of a pharyngeal adenoid.

Rousseaux, of Brussels, ¹⁸⁶, has collected sixteen cases of bleeding following the usual methods for the removal of adenoid vegetations, and again advocates the use of his electric curette, by means of which the operation can be performed without haemorrhage. De Roaldes, of New Orleans ¹²; Mendel, of Paris ¹⁰⁰; and Foucher, of Montreal, ¹²² following the lead of Moritz Schmidt, Calmettes, Lubet-Barbon, and Royals, advocate the use of bromide of ethyl as an anaesthetic in adenoid operations. [Bromide of ethyl was introduced in New York City in 1879, and given a fair trial at the Roosevelt Hospital. It was pronounced unsatisfactory and abandoned. It is possible that an improved quality has lately been secured.—ED.]

Thornwald's Disease.—Ruault and Lubet-Barbon ¹¹ both contributed papers at the meeting of the Society of Laryngology, held in Paris, December 4, 1891, upon the treatment of catarrh of the pharyngeal tonsil, particularly the form known as Thornwald's disease. Ruault believes that the diseased crypts should be freely opened, while Lubet-Barbon advises the free scraping away of the thickened adenoid. [In view of the difficulty of the former procedure, the latter would be both more easy and more thorough. It is well, in some cases, to apply the solid nitrate of silver after the curetttement.—ED.] Chiari, of Vienna, ⁸, states that, in three thousand patients, he had only found eight cases of this disease. His views upon the subject are controverted in a somewhat prolix article by Ziem, of Danzig. ⁸

NASO-PHARYNX.

Epithelioma.—Robertson, of Edinburgh, ², reports an interesting case of epithelioma, in which the growth was situated upon the vault and the posterior wall of the pharynx. On the right side the tumor had broken down. It involved part of the right nasal cavity. There was glandular enlargement behind the left sterno-mastoid. In the discussion, McBride said that he had seen one case in which epithelioma originated from the vault.

Scleroma of the Throat, Larynx, Trachea, and Nose.—Paltauf ⁸, says that, in a doubtful case, the failure to find the characteristic bacilli would exclude the diagnosis of rhino-scleroma.

The cell-degeneration in this disease is connected with the scleroma bacilli, and is caused by them. The results of his investigations are summed up as follows: 1. The so-called primary laryngeal and tracheal stenosis are identical diseases with scleroma of the nose. Scleroma may be primary in the nose, generally the posterior part, but also in the larynx and trachea. 2. The presence of the rhino-scleroma bacilli is, in doubtful cases, of diagnostic value. 3. The bacteria of scleroma differ from the nearly-related Friedländer bacteria in their lesser virulence, their lesser power of causing fermentation in sugar solutions, their greater sensitiveness to acids, and, finally, by their behavior in milk and in old gelatin cultures.

DISEASES OF THE LARYNX, TRACHEA, AND ŒSOPHAGUS.

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THE LARYNX.

Anatomy and Physiology.—T. P. A. Stuart, of Sydney, Australia, ⁶, has studied the mechanism of the closure of the larynx during glutition in a man with a hole in the neck; in healthy persons laryngoscopically, and experimentally in animals. When simple closure is to be effected in man, the arytenoid cartilages (1) are rotated so that the vocal processes come into apposition, (2) glide forward on the cricoid, (3) further approach each other so that their inner faces are, in part, in contact, and (4) fold forward at the crico-arytenoid joint so that their tips come into contact with the lower part of the epiglottis; the aryepiglottic folds, at the same time becoming tense, pull inward the lateral margins of the epiglottis, and so deepen its groove to receive the tips of the arytenoids and supra-arytenoids. A slight movement of the entire larynx upward and forward takes place, and in glutition this becomes more pronounced. The epiglottis does not move, and in glutition the bolus is seen to glide over its laryngeal surface, the lingual surface being closely pressed against the dorsum of the tongue. The obliteration of the air-tract is thus due to a folding-up of the mucous membrane of the margins of entrance and the sheltering of the larynx under the tongue.

Réthi, of Vienna, ¹¹⁸, ¹³, in a series of experiments upon dogs and rabbits, observed the relations of the epiglottis, the arytenoid cartilages, and the lower segment of the pharynx during the act of glutition; made a graphic record of the individual movements and the degree of pressure before and after section of the various nerves related to these parts; investigated the relation between section of the middle laryngeal nerve and inspiration pneumonia; and studied the physiologic significance of the retro-laryngeal connective tissue and its behavior during the act of glutition. He found that the bolus, after its way forward had been

cut off by the application of the tip of the tongue to the palate, was forced backward under considerable pressure by the action of the mylohyoid muscles. The soft palate was elevated and, by the combined action of the elevator of the soft palate and the palato-pharyngeus muscles, brought in apposition with the posterior wall of the pharynx, which was pushed forward as a result of the action of the constrictor of the pharynx, so that the nasal chamber was perfectly cut off from the pharynx. The larynx was raised and pushed forward; the tongue was retracted and depressed by the action of the hyoglossus muscles; the lower portion of the epiglottis was applied to the entrance to the larynx; the swallowed mass depressed the margins of the epiglottis, without significant active participation of the thyroepiglottic and aryepiglottic muscles. The adductors of the larynx, including the cricothyroid muscles, enter into function; the glottis is closed; and the apices of the arytenoid cartilages are directed forward. The posterior wall of the pharynx has already, at the level of the arytenoid cartilages, been applied to the relaxed retropharyngeal tissues as a result of the activity of the stylopharyngeus muscles, supplied above by the stylopharyngeal nerve and below, in the dog and rabbit, by the middle laryngeal nerve, both above and especially below, and the mass, which has been forced backward from the mouth under great pressure, is, with the aid of the suction of the pharynx, directed toward the entrance to the oesophagus; while, at the same time, any defect in the closure of the larynx is neutralized by aspiration. This diminution of pressure, to which, in part, is due the deflection of the mass from the larynx posteriorly, tends, in addition to the other factors,—such as closure of the entrance to the larynx and glottis, sensibility of the mucous membrane of the larynx, and suspension of respiration during the act of swallowing,—to protect the organism from the dangers associated with the act of swallowing. Finally, the peristaltic activity of the pharynx carries off what may be left.

A pathological condition throwing some light on the production of voice is reported, especially in this connection, by Vacher, of Orleans.¹³⁶ It existed in a girl 17 years of age, who had been aphonic for a week. Nevertheless, by a violent effort she was able to produce the highest-pitched tones of her register. There was an ulceration as though made with a punch on the right vocal

band at its arytenoidal insertion, as if it had been completely detached. Thus the vocal bands could not vibrate their entire length, and the lower tones were lost; but when a violent effort was made they became thoroughly approximated and permitted the more acute sounds by escape of air through their anterior third. The cause of the ulceration could not be determined. There was no question either of tuberculosis or of syphilis.

J. S. Risien Russell, of London, ^{and} has carefully studied the anatomical and physiological relations of the abductor and adductor fibres of the recurrent laryngeal nerve in dogs. He isolated the different bundles of nerve-fibres and observed the action of the vocal bands as each bundle was separately electrified. He likewise exposed the separated bundles of nerve-fibres under like conditions to the drying influence of the external air and observed the relative duration of their vitality. For control, he traced by dissection each bundle of nerve-fibres to its termination in the mucous membrane or in a muscle of the larynx; exposed the muscles of the larynx immediately after death, and observed them during excitation of different bundles of nerve-fibres and during direct excitation of the muscles themselves; and finally observed the muscular degenerations following the division of one or other bundle of nerve-fibres in the nerve-trunk. His researches warrant the conclusion that the muscles closing and opening the glottis are respectively supplied by different bundles of nerve-fibres, preserving an independent course from centre to periphery, the abductors being situated on the tracheal side and the adductors on the external side of the nerve. In the adult animal simultaneous excitation of all the fibres of the recurrent nerve produces adduction of the vocal band, but in the young animal abduction results. The abductor fibres lose excitability more rapidly than the adductors, in accordance with the clinical observations of Semon on man. The bundle of nerve-fibres concerned with one function may be excited without effect, as the muscles of opposite functions; similarly, in case of division of either bundle, wasting takes place only in the muscles supplied by that bundle.

Laryngitis.—In a thoughtful paper on the relation of disturbances of the mucous membrane of the upper air-passages to constitutional diseases, Beverley Robinson, of New York,¹

emphasizes the importance of studying diathetic conditions, whether hereditary, or due to contagion, or to insalubrious surroundings. Tuberculosis, syphilis, scrofula, gout, carcinoma, and alcoholism are cited among other conditions which are liable to give rise to chronic inflammations of the mucous membranes of the upper air-tract.

Catarrhal Laryngitis.—Ragoneau¹⁸⁸ reports that he has seen nine cases of catarrhal laryngitis, in subjects from 18 to 27 years of age, the result of bicycling, tricycling, etc. The patients complain of sensations of dryness and tickling, and even of burning; then cough occurs, with expectoration of mucus, and occasionally even of a few strands of blood, and, finally, there is a muffled voice. Laryngoscopy reveals congested mucous membrane, with congested granulations, and discolored vocal bands covered with mucosities. The disease is attributed to the improper position taken by these subjects in their exercise, inclining the body forward and thus impeding respiration and rendering it necessary to respire by the mouth as well as the nose, while the rapidity of the pace drives the air into the larynx and lungs under increased pressure. A case of eversion of the ventricle occurring in the course of an ordinary acute laryngitis is reported by Beau-soleil, of Bordeaux.⁸

Oedematous Laryngitis.—Kanasugi²⁰⁰ reports a case of this kind, due to potassium iodide administered to a syphilitic patient with laryngitis, and which subsided upon suspending the medicine. The œdema occurred the day after dusting calomel powder into the throat, ten days after the iodide had been prescribed. Vladimir A. Padütczeff²¹⁵³,¹¹ reports a case of intense œdema of the aryepiglottic folds and epiglottis suddenly developed in a boy, 11 years of age, during an attack of measles. Tracheotomy was imperative when the case was first seen, and the laryngoscopic examination was made on the day following. Attempts to remove the cannula were followed by suffocative attacks until the thirteenth day. He refers to two other of his cases requiring tracheotomy, both caused by drinking ice-water when the patients were in an overheated condition. Boris I. Kotelansky, at the same meeting, mentioned two cases recovering without tracheotomy; one in a boy of 11, about a week and a half after an attack of measles, and the other in an infant, the cause of which is not mentioned in the article from which this reference is made.

L. Dorange²⁴⁸ reports a case following cold, in a vigorous soldier 28 years of age. Tracheotomy became necessary. Pneumonia followed, and after its subsidence, and the almost complete restoration to health a month after the tracheotomy, a second pneumonia took place, involving the same region as the first attack. Two years after his final recovery the patient was found to have remained in perfect health with a perfect voice.

J. H. Bryan, of Washington,⁹ reports a case of acute œdema of the larynx resulting from pyæmia, which seemed to have followed the introduction of a sound to relieve a urethral stricture following gonorrhœa. The patient was an intemperate man, 30 years of age, of strong physique and subject to mild attacks of sore throat. The constitutional symptoms became worse, despite relief to the œdema by scarification, and death ensued from supposed rupture of an abscess in the liver. Heymann³⁶⁹ describes a case resulting from the administration of potassium iodide.

Addeo Totti³⁷⁶ reports a case of secondary œdema of the larynx, following suppuration of a deeply-seated gland in the region of the carotid artery. The œdema involved not only the aryepiglottic fold and the epiglottis, but likewise the entire right side of the pharynx, the tonsil, the soft palate, and the uvula. Extirpation of the lymphatic gland produced immediate marked relief. Symes, of Kiltegan,¹⁸ observed the case of a man, 40 years old, in whom, shortly after removal of a loose bicuspid tooth, cellulitis of the face and neck developed. The condition failed to respond to the therapeutic measures employed, but progressively extended, until there was marked interference with respiration. œdema of the pharynx developed, and afterward œdema of the larynx. The interference with respiration became so pronounced that laryngo-tracheotomy had to be performed. The operation was attended with considerable difficulty, and artificial respiration became necessary. Convalescence was at first tardy, but eventually proceeded to perfect recovery.

Rheumatic Laryngitis.—Luc³⁷ reported the case of a man, aged 30 years, with acute generalized articular rheumatism, in whom there occurred, as the articular pains subsided, pharyngeal and laryngeal odynphagia, laryngeal dyspnœa, high fever, and nightmare. The left crico-arytenoid joint appeared to be swollen, and the vocal band was immobile in adduction. Under treatment with phenazone internally and cocaine locally, the swelling and

pain disappeared and the vocal band regained its mobility. In the discussion, Ruault reported a somewhat similar case in a woman of 40 years, and alluded to the diagnostic value of a difference in level of the vocal bands in affections of the crico-arytenoid joint.

Acute Rheumatic Crico-arytenoid Synovitis.—Grünwald,⁴ reports five cases with the following subjective manifestations following the catching of colds: (1) Disagreeable sensations on one or both sides, referred to the angle of the jaw, the base of the tongue, or the tonsils, and especially severe during glutition; (2) similar sensations produced by external pressure over the region of the crico-arytenoid articulation of the affected side; (3) sensible and sometimes audible crepitation upon such pressure, and only in response to such pressure; (4) inward movement of the arytenoid cartilage upon such external pressure; (5) circumscribed sensitiveness of the region of the joint upon pressure, with an oesophageal sound. Laryngoscopic inspection does not reveal any special lesion. Care is requisite not to confound these manifestations with paræsthesias.

Hypertrophic Chronic Laryngitis.—Villeneuve,⁴⁶ of Marseilles, observed the case of a man, 31 years old, of good family and personal history, who, for three months, had presented progressively increasing dyspnœa, to which cough became superadded. On laryngoscopic examination, appearances were found upon which a diagnosis of hypertrophic subglottic laryngitis was based. In an attack of dyspnœa suffocation seemed imminent, and tracheotomy was performed. The respiratory difficulty was temporarily relieved, but, upon recurrence of the dyspnœa, it was determined to practice laryngo-fissure with grattage. Three weeks and a half after the operation the cannula was permanently removed. For five weeks there was freedom from dyspnœa, when the recurrence of a paroxysm necessitated the repetition of tracheotomy. The man was well two years later, but still wore his cannula. From a microscopic examination of the tissue removed, it was thought that the condition was one of perichondritis.

Perichondritis of the Larynx.—Baumgarten, of Pesth,^{84, 11} reports a series of rare cases of perichondritis of the larynx:—

I. A boy, 17 years of age, swallowed a chicken-bone. Some weeks later the left ventricular band and the whole left half of the larynx were swollen, followed by discharge of pus from the left

ventricle and exfoliation of a portion of the left arytenoid cartilage. Recovery.

II. A patient, 27 years of age, had dysphagia and dyspnœa after catching a cold. The left half of the larynx became swollen, and pus was expectorated. Some weeks later there was exfoliation of parts of the left arytenoid cartilage. Recovery.

III. A patient, 30 years of age, caught a cold which was followed by hoarseness and pain in the larynx. Two months later the right half of the larynx was swollen and sensitive. There was œdema and a tumor the size of a walnut over the right vocal band. It was removed with forceps, and consisted of normal mucous membrane filled with pus. Two months later the left half of the cricoid cartilage was expectorated, and some time later the right half of the cricoid.

Tuberculosis of the Larynx.—An interesting case of primitive tuberculosis of the larynx is reported by Trèkaki.⁸⁷ A man, 35 years of age, had suffered moderately with asthma from childhood. In 1882 he acquired chancre and was treated for secondary syphilitic ulcerations of the tongue in 1885. In 1891 he became continuously dyspnœic without aggravations night or day, and was compelled to maintain the semi-recumbent position. Laryngoscopic inspection was impossible. The tongue was lobulated, hard, and impeded in its movements, presenting the typical sclerosed tongue of tertiary syphilis. The dyspnœa increased despite antisyphilitic treatment, and at no time could any lesion be detected in the lungs. At the end of three weeks he died rapidly of suffocation, which began about an hour after his dinner. The lungs were found infiltrated with grayish granulations the size of the head of a nail, between which the pulmonary tissue appeared healthy. In the larynx, a tumor the size of the thumb-nail was found in the mucous membrane of the left ventricular band, extending as far as the glottis and impeding the play of the vocal band. It projected into the interior of the larynx, almost completely obstructing its lumen. Histological examination revealed the tuberculous character of this growth, as well as tuberculous granulation in the mucous membrane of the trachea and around its glands. We have here an example of descending tuberculosis occurring in a syphilitic subject.

C. S. Gray, of Little Rock, Ark.,⁵⁰⁸ reports an unusual case

of extensive tuberculosis of the larynx with suppuration from the deep lymphatics of the neck, discharging by fistulous openings, one on each side.

Treatment of Laryngeal Tuberculosis.—Walker Downie²¹⁸ presents additional evidence of the benefit from intra-laryngeal injections of guaiacol and menthol, and is confirmed in his results by the experience of several other practitioners who have used the treatment. Resorcin has been used successfully in the treatment of ulcerations of the larynx by Tymowski,¹⁷⁵ since 1884. The most certain and agreeable method is to use it in solutions of from 80 to 120 per cent., which do not provoke pain. Immediately after this application the infiltrated parts become covered with a whitish coat which remains for several hours, and the œdema and the suppuration diminish inevitably under the daily usage of the remedy. While there is danger of recurrence as long as infiltration of the larynx and tuberculosis of the lungs remain, the patient is rendered much more comfortable, and, it is claimed, is sometimes thoroughly cured.

Tracheotomy is strongly urged by Reinhold Stein, of Berlin,⁴¹ who, in concluding an elaborate paper on the subject, recommends resort to it in all cases where suffocation is imminent, irrespective of the debility of the patient or of the great extent of pulmonary complication; as a prophylactic procedure before the onset of suffocative manifestations in severe and augmentative involvement of the larynx, with moderate disease in the lungs; in mild cases, where the attending physician is unable to prosecute the proper topical treatment, or where the lesion is beyond the reach of topical measures, and in cases of difficult glutination, where nutrition can be kept up only artificially by means of the œsophageal tube.

A. Bertels, of Riga,²¹ reports two cases in which laryngotomy was practiced after preliminary tracheotomy, and the diseased tissues in part scraped away, and in part destroyed with the thermo-cautery. Despite good results at first, no tendency to cicatrization was manifested. Fresh ulceration took place and both cases terminated fatally, permanent tracheal fistulae remaining after removal of the cannulas. Stein, of Berlin,⁴¹ Jahrs 9, 12, et seqq. reported five cases of laryngeal tuberculosis, in which tracheotomy was performed for the relief of urgent dyspnœa. In all, life was pro-

longed. Three died after varying intervals of time, from conditions not related to the operation. The other two were still living twelve and eighteen months, respectively, after the operation.

Tuberculosis and Syphilis.—Instances of co-existing tuberculosis and syphilis are accumulating, and one, in a man 20 years of age, has given our esteemed corresponding editor, de la Sota, ¹⁸_{Jan., Feb.} the text for an admirable paper on this subject, illustrating the difficulties of diagnosis.

Syphilis of the Larynx.—Strauss, of Berlin, ¹⁵⁸_{B.14.B.1; Sept.} has made a study of late syphilis of the larynx in children. Only three cases have been seen in eight years at the clinic of B. Baginsky, which is visited by over two thousand patients per annum:—

1. A girl, 7 years old, had for three weeks hoarseness and odynphagia. There was great infiltration of the epiglottis and ventricular bands, which were red, thickened, and studded with granulations resembling lupus, if not tuberculosis. The vocal bands were reddened and covered with mucus. Later, the uvula was swollen and the site of an ulcerated plaque, the epiglottis became ulcerated, and periosteal nodules developing on the tibia indicated the true nature of the disease.
2. A girl, aged 12 years, exhibited a high degree of dyspnœa with inspiratory and expiratory stridor and aphonia. The pharynx was the seat of cicatrices, the anterior palatine fold was perforated, the epiglottis was swollen, and the posterior wall of the larynx was ulcerated, the ventricular bands being involved. The ulcer was covered with a grayish-white secretion. The vocal bands were thickened and deformed, and the subglottic parts were much swollen. The mother had a syphilitic history.
3. A boy, aged 12 years, had for half a year complained of pain in the throat and dysphagia. There was hoarseness and stridor. The cervical lymph-glands were swollen. No syphilitic history could be elicited from either parent. The entire larynx was swollen; the epiglottis bore on both faces multiple papillary excrescences, and on the laryngeal face of the free border, somewhat to the right of the median line, an ulcer. Over the right suprathyroid was seen a small granulation tumor. Both arytenoids and ventricular bands were asymmetrically swollen. The vocal bands seemed white, so far as visible. Specific treatment caused improvement. Adding to these observations 11 cases from litera-

[Syphilis
of Larynx.

was the seat of progressive perichondritis; in 3 cases both ears were affected. The process was bilateral in 2 cases; the process was unilateral in one case.

syphilis as follows: 1. Erythema. 2. Erosions. 3. Ulcerations (mucous patches). 4. Paralysis. As to topical treatment, he advises emollient fumigations, antiseptic sprays (solutions of mercuric chloride or carbolic acid), and cauterization with silver nitrate or chromic acid (1-20) after application of cocaine.

Iljin,²¹ has observed, at the Warsaw Military Hospital, sixty-seven cases of syphilis of the larynx, principally in the condylomatous stage. The only topical treatment that appeared to be useful was insufflation of calomel. Augagneur^{41, 121}, ^{Jan., Apr.} advocates the use of potassium bromide in connection with potassium iodide, in the treatment of the dysphonia that sometimes occurs in the sixth or seventh month of syphilis, when nothing but erythema can be observed in the larynx. Natier⁸, reports a case of crico-arytenoid arthritis, due to acquired syphilis, in a girl of 16 years, with recovery under specific treatment.

Erysipelas of the Larynx.—Sokolowski²⁸⁶, ^{Sept., Oct.} contributes some interesting observations on erysipelas of the larynx, reporting four cases of recent occurrence in his practice. One was in a young female servant who seemed to have acquired the infection from a folliculous angina, in which, according to the quoted researches of Sendtner, of Munich, the presence is observed of both the streptococcus pyogenes and the streptococcus of erysipelas. The erysipelas occupied the posterior wall of the larynx which it mounted, extending to the hyperæmic and oedematous ventricular bands, which hid the vocal bands from view. The patient was in considerable continuous peril for several days, toward the last of which erysipelas of the nose and face occurred, after which slow recovery ensued. A somewhat similar case, in a woman 60 years of age, terminated fatally on the ninth day, erysipelas of the cheek having developed the day before death. The autopsy revealed purulent infiltration of the larynx. Two other cases, terminating favorably, are reported, in which the acute oedematous process in the larynx seemed to have been dependent upon localized inflammation of the tonsils and especially of the follicles.

Oscar Samter⁶⁰, narrates an instructive instance of primary erysipelas of the larynx in a painter's assistant, 37 years of age, with kyphosis, but with no evidence of tuberculosis, who was seized suddenly one evening with a chill, soon followed by difficulty in swallowing. The following day great swelling and redness of the

epiglottis was noted. This increased so that tracheotomy became necessary. The next day all the explorable parts of the larynx were seen to be affected. Then the tracheotomy wound became involved and rapidly extended over the greater part of the trunk. The patient made a good recovery.

Herpes of the Larynx.—Scholefield¹³ reports the case of a man, aged 41 years, admitted to St. Bartholomew's Hospital, suffering with dyspnoea, odynphonia, odynophagia, and consequent nervous excitement. Attempts to swallow were attended with painful contortions not only of the face, but of the whole body. There was very great pain on the left side of the neck, which was also very sensitive to pressure. The cervical glands were enlarged and tender. Temperature was 103.4° F. (39.7° C.), pulse 116, respiration 25.

At first hydrophobia was thought of. The pharynx was very red and the uvula slightly oedematous; after application of cocaine the larynx could be examined, and there was found, on the edge of the left aryepiglottic fold, near the reddened arytenoid, a movable mass about the size and shape of three peas, red, smooth, and glistening like a polyp. The general condition improved under rest, an ether draught, and cold compresses to the neck. The mass became vesicular, milky-looking, then in about forty-eight hours purulent, the arytenoid becoming more swollen, and at the same time a patch of herpes was observed about the left nostril and upper lip. Next day the temperature was subnormal, the laryngeal bulla had disappeared, its place being occupied by a whitish patch described as "macerated epithelium," the swelling subsided, pain gradually lessened, and in about two weeks the man was discharged.

Pemphigus of the Larynx.—Wagnier^{13a} July 16 reports a case of pemphigoid, bullous eruption of the larynx in a man, 63 years old, who had complained for two days of sore throat, which had begun with difficulty of swallowing, soon followed by a severe chill and fever, and these by hoarseness and difficult respiration. At the end of three days more the fever subsided, but the dysphagia and dyspnoea continued. A laryngoscopic examination was now made, disclosing two hemispherical, whitish-gray tumors the size of small nuts, one on the buccal face of the epiglottis and the other on the internal face of the left arytenoid and the interarytenoid fold.

They were punctured and slowly subsided, leaving hardly any traces at the end of six days.

Actinomycosis of the Larynx.—Mündler, of Heidelberg,⁷⁶¹ describes three cases of actinomycosis of the larynx, without involvement of neighboring structures. In two cases either carious teeth or the mucous membrane of the lower jaw seemed to have been the port of entrance of the infection. In a man aged 57 years the inflammatory swelling appeared endolaryngeally and gave rise to the suspicion of malignant neoplasm. In the two other cases the laryngoscopic picture was quite normal, the tumor involving the exterior aspect of the thyroid cartilage. Extirpation of the disease was successfully practiced in all the cases.

Lupus of the Larynx.—A case of primitive lupus of the larynx is reported by M. Garel¹³⁶ in a female 22 years of age. The laryngoscopic image was typical and the histological examination of a prominent nodule extirpated from the epiglottis placed the diagnosis beyond doubt. Garel likewise reports a case of secondary lupus of the larynx in a female domestic, 17 years of age, with great improvement in consequence of an attack of facial erysipelas which closely followed the extirpation of a prominent nodule on the epiglottis.

Leredde⁷ reports a case, in a female patient who died from dyspnoea, due to oedema of the glottis before there was an opportunity to perform tracheotomy, and after there had been several months of amelioration following some ineffective attempts to cure the case with inoculations of Koch's lymph. Histological examination exhibited giant-cells formed by degeneration of the glandular alveoli.

P. McBride²⁶ records his personal observations of lupus of the upper air-passages, and states that, in contradistinction to the report of most other observers, he has found the thickened parts red and not pale, and rather an absence of any marked tendency to ulceration, the eaten-out appearance, in some cases, indicating rather submucous absorption permitting falling of the lupoid surface.

Mycotic Sore Throat.—Capart reported, at the Annual Meeting of Belgian Laryngologists, June 5, 1892,¹¹ three cases of acute mycotic sore throat, of which the principal symptoms, in addition to the whitish spots in the pharynx, were odynphagia,

vomiting, diarrhoea, mydriasis, and paralysis of accommodation. Recovery was rapid. In the first case the patient had been in the neighborhood of several sick pigeons, and an autopsy of birds that died showed from beak to oesophagus the same condition as the patient's. The other patients had eaten "pâté de perdreaux."

Laryngeal Haemorrhage.—Our corresponding editor, de la Sota, of Seville, Spain, refers to a very interesting case of cata-menial haemorrhage from the larynx⁶³⁸ in a lymphatic, hysterical woman, who was 25 years of age. Compaire⁵⁰⁸ reports two cases: 1. A young lady, 25 years of age, somewhat hysterical, had suffered the last two years from menstrual disorders. Copious menstruation took place under treatment. Suppression ensued, at the end of two months, with haemorrhage from the larynx at the menstrual period, and coinciding with the onset of pharyngolaryngeal catarrh. 2. A girl, 21 years of age, had not menstruated for a year, but had suffered from laryngitis at each period, at which times she had sanguineous expectorations. There were chlorosis, exophthalmic goitre, and tachycardia. She died from heart disease, somewhat later. The author is inclined to think that these discharges are never pure blood, but only sanguinous serum.

Hal Foster¹⁰² records a case of haemorrhage from the left ventricular band in a robust opera-singer, 36 years of age, in whom a haemorrhage of about one hour's continuance had followed great vocal strain and bodily exertion during a performance. Treitel⁶⁰⁹ reports a case of haemorrhagic laryngitis sicca occurring in a woman, 30 years of age, during a menstrual period.

Carcinoma.—In an excellent paper on the diagnosis and treatment of laryngeal cancer, Gottstein⁶¹⁰ expressed his belief that in the majority of instances carcinomatous infiltration of the tissues precedes the development of the tumor. According to his experience, carcinomatous infiltration, without tumor formation, occurs more frequently and remains under observation much longer than carcinomatous tumors without infiltration. In one of his cases the carcinomatous infiltration existed for at least three years before the tumor began to be formed. Gottstein places little pathognostic value upon impaired mobility of the affected vocal band, and realizes that the extirpation of fragments of the growth

for microscopic investigation is usually impracticable. He relies greatly upon diagnosis by exclusion, taking carcinoma for granted whenever tuberculosis, lupus, syphilis, etc., can be safely excluded in the presence of a diffuse infiltration.

As to treatment, endolaryngeal procedures are justifiable only in very circumscribed growths without surrounding infiltration, and unjustifiable if there be the slightest infiltration. If the infiltration be slight, the larynx may be split and the diseased tissues excised with a surrounding zone of healthy tissue. If the infiltration be extensive, partial or total extirpation of the larynx is requisite accordingly.

L. Lichtwitz, of Bordeaux,⁸⁷ reports a case of carcinoma of the left vocal band removed by laryngo-fissure, with death five days later, from hypostatic pneumonia. The interesting points of the case are the difficulties of the operation, which consumed more than three hours, owing to the difficulty in illuminating the parts and interruptions from suffocative paroxysms due to penetration of blood into the bronchi, despite the use of a tampon cannula; and the reports of Waldeyer on the specimens submitted to him from fragments removed endolaryngeally, in which he regarded the sections as suspiciously, but not positively, carcinomatous, and expresses his opinion that benign papillary tumors may become carcinomatous.

Baginsky⁸⁸ reports an instance of carcinoma of the larynx occurring as a consequence of carcinoma of the thyroid gland, in a man 48 years of age. During life the left vocal band was immobile in the middle line. The right vocal band was not drawn tense in phonation, but remained sickle-shaped, so that its farthest point from the left band was about three millimetres. There was a circular ulcer on the vocal process of the right arytenoid cartilage. There was a peculiar tremor of the left arytenoid cartilage, which made intermittent, jerky movements, in which the tense left vocal band did not participate. At the autopsy a carcinoma of the thyroid gland was found to extend between the trachea and oesophagus and into the jugular fossa and in front of the larynx.

R. Köhler⁸⁹ reports absence of recurrence four and a half months after the extirpation of a carcinoma by laryngo-fissure (thyrotomy), excision and cauterization, in a man 54 years of age.

The disease was not deeply situated, although extensive in surface, and, therefore, this procedure seemed sufficient. The operator always performs the tracheotomy and the section of the larynx in the one sitting, and operates with the head pendent.

Pachydermia.—Edmund Meyer,⁴ reports two cases of pachydermia verrucosa laryngis. In one a large, grayish-white growth, springing from the right ventricle, nearly occluding the larynx, was at first taken for carcinoma. Microscopic examination of an extirpated fragment revealing its benignancy, it was removed endolaryngeally in several fragments. Careful investigation showed it to be a pachydermia verrucosa. The clinical and laryngoscopic features of this case are quite peculiar. The second case is one of those ordinarily classed as pachydermia. Karl Kausch,^{34, 10, 26} reports eleven typical cases, and three others in association with tuberculosis. Michelson,⁴ reports eighteen cases, two of which were associated with tuberculosis. In a third case it was found, at the autopsy, that the walls of the elevated tissue were composed of thickened, squamous epithelioma, while tuberculous ulcerations were found in the excavated portions. Kausch speaks rather favorably of the good effects from inhalations of acetic acid in 2-per-cent. solution in water, as recommended by Scheinmann,⁴ who has had good results, including perfect recoveries in two well-marked instances, from inhalations of a 2- to 3-per-cent. solution of acetic acid, three times a day, ten minutes at a time, and continued for several weeks.

The late P. Michelson, of Königsberg, left a paper on the connection between pachydermia laryngis and tuberculosis.⁴ At a meeting of the Verein für Wissenschaftliche Heilkunde, Michelson exhibited a larynx from a female subject, presenting the typical characteristics described by Virchow. This is the first reported instance of the typical form of the disease noted in a female subject. He then reported and illustrated a few instances of the disease in association with tuberculosis, one of which presents the most typical representation that has as yet been published.

Adenoma.—An additional example of true adenoma of the larynx is recorded by Schmiegelow, of Copenhagen,¹³⁶ in a woman 46 years of age, and in apparent good health. She began to grow hoarse without assignable reason, in July, 1887, but the

hoarseness had never been excessive. There was no pain, dysphagia, or haemoptysis. December 15, 1887, M. Olsen detected a neoplasm on the right side of the larynx, in fragments of which he found a carcinomatous arrangement of the epithelial elements, with partial colloid degeneration. On February 2, 1888, the patient was sent to Schmiegelow, who found the entire right ventricular band the seat of considerable irregular vegetation of a pale-red color, and ulcerous-looking here and there. A small portion, the size of a common pea, near the anterior commissure, was separated by a groove from the other portion of the neoplasm. On February 4th, after tracheotomy and laryngo-fissure, the perichondrium and the muscles of the right half of the thyroid cartilage were separated from it with blunt instruments, and the whole half of the thyroid cartilage, the arytenoid cartilage, and the greater portion of the interarytenoid fold were removed with curved scissors. Microscopic examination of the neoplasm showed it to be an adenoma. The patient did very well and was dismissed on March 27th. She continued to do well until the summer of 1889, when she began to suffer with gastric disease attributed to carcinoma, and died cachectic on December 12, 1889, without any evidence of local recurrence in the larynx.

Keratosis.—Under the caption circumscribed keratosis of the larynx, G. Juffinger⁸ describes a very peculiar, bilobed, morbid growth occupying the anterior commissure of the glottis, and involving the inferior surfaces of the vocal bands, in a 16-year-old female, the subject of ozæna. A few delicate, pointed, white projections from the smooth and glistening surface of the growth resembled little fragments of bristles, or spiculæ of fish-bone. Under the microscope these projections were found to consist of an outer sheath of parallel corneous epithelium and a central sheath of irregular epithelium. The histological appearance of these projections and of the basal portion of the growth from which they originated are detailed and illustrated. In view of the abnormal cornifying process which the epithelium had undergone, the disease is named circumscribed keratosis of the larynx. The change of ciliary epithelium into squamous is attributed to inflammatory processes, although no evidence of transitional forms could be detected in any of the preparations examined.

Cystoma.—O. Chiari⁸ has written an interesting illustrated

paper on the development of cysts in polyps of the vocal bands. He contends that the cystic formation is almost always dependent upon dilatation of the lymph-vessels, upon dilatation of the connective-tissue spaces, or upon serous transudation in the epithelium or under it.

Varix of the Vocal Band.—O. Chiari exhibited to the Gesellschaft der Aerzten of Vienna⁸ a series of sections and microphotographs from a vocal band found in the dead subject, with a small, bluish nodule, 1 millimetre in diameter, on its free border, and which he pronounced a varix. Billroth considered it rather a cavernous tumor.

Papilloma.—Our corresponding editor, de la Sota, of Seville, Spain, calls attention to a case of multiple papilloma, with stenosis of the larynx, in a lad 10 years of age, which were extracted by J. Rogner Casadesús,⁶³³ without precautionary tracheotomy, and with excellent results.

Rhinoscleroma.—Moskowitz, of Budapest,⁶²² records the death from suffocation of a tracheotomized woman, aged 52 years, with extensive sclerosis of the air-passages. It had begun about six years previously as rhinoscleroma, and successively invaded the pharynx, larynx, and trachea.

Hypertrophy of the Epiglottis.—C. C. Rice¹ advocates the ablation, with scissors, of redundant portions of the epiglottis, when the size of that structure gives rise to troublesome symptoms.

Instruments.—C. Goris, of Brussels,⁵² describes a new and delicate polypotome for the removal of small growths. Dundas Grant recently exhibited, before the British Laryngological and Rhinological Association,¹¹ a pair of guarded, double-jointed cutting forceps, modeled upon the oral and pharyngeal scissors devised a few years ago by Sherwell, of New York. A pair of hinged prolongations, jointed at their distal extremity, form a lozenge-shaped aperture when the forceps are opened, while the hinged distal extremity effectually guards from other injury than the mere pressure any tissues with which it may come in contact. It is intended for the removal of growths projecting from the sides of the larynx.

Foreign Bodies in the Air-Passages.—More than the usual number of cases of foreign bodies in the air-passages have been reported during the last year. From among the most instructive of

these we select the following: Successful removals under laryngoscopy have been reported, of two fish-bones from the larynx, by T. Melville Hardie, of Chicago⁷⁷⁹; a needle, by C. Goris, of Brussels.⁵² Gouguenheim, of Paris,¹¹ extracted with forceps a plate of false teeth from the larynx of a woman, 39 years of age, eight days after having performed tracheotomy. The accident had occurred fifteen days before entrance into the hospital, in the course of an attack of epilepsy. The extraction was easy, and the foreign body, as seen laryngoscopically, almost completely obstructed the laryngeal cavity, the patient being aphonic, and having pronounced stridor. Ramon de la Sota y Lastra⁶⁸³ records a case of extraction of a leech adhering to the wall of the trachea at about the fourth ring, after cocaineizing the parts with a 10-per-cent. solution.

Thomas J. Harris,¹ records an instance of detachment with forceps, under laryngoscopy, of a piece of gristly corned beef about half an inch long from the upper portion of the trachea of a woman 50 years of age. George Ryerson Fowler¹⁵⁷ reports an instance in which a broken tracheotomy-tube had parted from its shield and lodged at the bifurcation of the trachea, whence it was successfully removed by his house-surgeon. The solder connecting the tube with its shield had corroded, and the tube had broken off while being cleansed in position. Fowler recommends the use of a tube made in Germany in which the tube is spun over the shield and riveted. [In our own practice patients are provided with two tubes which are to be worn on alternate days, and are not allowed to wear one tube continuously without withdrawal.—Ed.]

G. H. R. Holden² cites a case in which a male infant, 14 months of age, inhaled a hook which fell from his mother's dress and was introduced into his mouth with his food. No symptoms were noted for twenty-two hours. Then there was stridor, catchy aphonic cough, and moderate dyspnœa. The dyspnœa increasing, laryngo-tracheotomy was performed, and the hook was seen with its thread-loops lying transversely across the larynx, separating the vocal bands from each other, the hook lying between them, with the bend in it lowermost. It was extracted and a cannula introduced and retained for six hours. The wound rapidly healed and there was no trouble during convalescence. The occasional tolerance of the air-passages to the sojourn of foreign bodies is

well exemplified by a case of J. A. Wilson,²¹³ in which a tin whistle remained for five months in the air-passages of a man 28 years of age. It was finally coughed out.

Helen S. Childs²⁴⁶ states that a clove remained five weeks, less a day, in the larynx of a boy 5 years old, when it was coughed out swollen and spongy, but perfect in shape. Skinner², reports a case in which a child, 12 months old, coughed up an orange-seed forty-six days after it had been inhaled. The long sojourn of a piece of oyster-shell in the larynx and trachea of a man, 54 years of age, is reported by a correspondent.¹⁰⁶ A fragment was coughed out seven months after its inhalation, and another fragment at the end of nine months.

C. Aubert, of Algiers,²³⁰ reports an interesting case of the entrance into the larynx of a leech, which changed its position from the posterior face of the epiglottis to the anterior surface of the first ring of the trachea, almost under the laryngoscopic inspection. There were three typical leech-bites also in the pharynx, upon one aryteno-epiglottic fold and on the upper portion of the epiglottis, evidently made by the leech in its descent. Tracheotomy was performed, a cannula inserted, and the leech was then removed with forceps under laryngoscopic inspection.

Samuel West⁶, reports a case of impaction of the gill-plate of a herring in the larynx of a child 9 months of age. It was removed with forceps several days after a prophylactic tracheotomy. The tube could not be removed for several weeks in consequence of functional paralysis of the abductors. Recovery was complete.

Wounds of the Air-Passages.—Richard Wagner, of Halle,²⁴, describes the case of a woman, 25 years of age, who severed the greater portion of her trachea and the right recurrent laryngeal nerve. The third tracheal ring had been almost completely cut or torn out in the attempt at suicide. A cannula was placed in the trachea and the wound closed. A triple stenosis of the trachea ensued immediately beneath the vocal bands, at the lower end of the peripheral fragment of the severed trachea, and at the upper end of the central portion of the trachea. The right vocal band was immobile in the median position. The lower two strictures were readily overcome by dilatation. The upper one remained ob-

durate. Just two months after the injury the immobile vocal band was seen to be directed a little outward, and on the following day assumed the cadaveric position. Dilatation was now easier, and, after scraping away some granulations beneath the vocal band, eventually succeeded, so that the patient could be discharged cured without a cannula some three months later.

Hulke⁶,_{Aug. 20} reports a case of suicidal wound of the throat completely severing the larynx and opening the gullet, with survival for several hours only after suturing the wounds. R. E. Lord⁶,_{Apr. 20} describes a case of complete extirpation of the larynx by a suicide. A man, 58 years of age, had cut his throat with a potato-knife and pulled out his larynx. Death ensued. Instances of fracture of the larynx, with recovery, have been recorded by Scheier,⁶⁹,_{Mar. 24} and Schüller.⁶⁹,_{Mar. 24}

Schloessing³⁸⁶,_{Feb. 12} reports a case of fracture of the cricoid cartilage. A fatal instance is reported by Zilgien.¹⁸⁴,_{Nov. 18, '91} Heymann exhibited to the Berlin Laryngologische Gesellschaft a patient whose left arytenoid cartilage lay tilted forward upon the vocal band. It was supposed to be of eight years' duration and to have followed diphtheritic inflammation of the nose and larynx. Cricoid perichondritis had probably existed, followed by necrotic destruction of the arytenoidal surface of the joint. Fraenkel mentioned a much more marked case which he had published, in which the cricoid perichondritis, to which he believes all such cases are due, occurred during convalescence from typhoid fever, and had rendered tracheotomy necessary. The patient still maintains the tracheal fistula, though he goes about without a cannula. Krakauer stated that he had a similar case under treatment in which the perichondritis was due to syphilis. Lewin reported a case, the result of syphilis, in which he had directed a tracheotomy which it was, unfortunately, impracticable for extraneous reasons to perform on the same evening, and the patient suddenly died of suffocation during the night. Section showed that a yellow body, seen laryngoscopically bulging behind the right vocal band, was a portion of the necrotic plate of the cricoid cartilage.

Stenosis of the Larynx.—Meinhard Schmidt, of Cuxhaven, reports³⁸⁶,_{Aug. 12} a case of stenosis due to congenital compression of the sides of the epiglottis. Stridor was noted soon after birth, and the child lived seven months. The epiglottis was found to be bent

in such a manner that the two lateral surfaces were strongly in apposition and reached the median surface to a great extent, so that the laryngeal aperture was like a figure 8, leaving but a small round opening front and back for the passage of air. Grant,¹¹ reported two cases of stenosis of the larynx due to tertiary syphilis. In one the dyspnoea was so marked as to necessitate operative interference. Intubation failing, tracheotomy was performed. Scheier,¹² observed a case of marked laryngeal stenosis in a married woman, 36 years old, who had been infected by her husband seven years previously. Three years after the development of the first exanthem, manifestations of laryngeal and later of nasal involvement appeared. For two years there had been progressively increasing dyspnoea, more recently associated with paroxysms of suffocation, so that tracheotomy had to be performed. Below the level of the vocal bands, which were but slightly mobile and the left of which was almost entirely destroyed, could be seen a membranous formation, leaving but a small orifice for the air-current. The nasal cavity and the hard and the soft palates presented destructive changes. It was proposed to employ tubage as a therapeutic measure.

Stenosis of the Larynx in Diphtheria.—Schlatter, of Zurich,²¹⁴ records the results of a study of 510 cases of diphtheritic stenosis of the larynx that came under observation at the Zurich Hospital, in the surgical service of Krönlein, from 1881 to 1891. Of the total cases 281 (55 per cent.) were in males, 229 (45 per cent.) in females; 260 (51 per cent.) terminated fatally,—133 males (47 per cent.), 127 females (55 per cent.). The number of cases diminished progressively from the maximum in 1882 (with an insignificant exception in 1886) to 1887; thereafter again to increase. The mortality did not at all correspond with the morbidity. The disease prevailed mostly in the winter months; the largest number of cases occurred in January; February and March came next in order, and these were followed by December. The smallest number of cases occurred during the summer and autumn, from June to October. The malignancy of the cases was also least during the summer; September was especially characterized by a high mortality-rate. No cases were observed in children in the first six months of life. The third year of life yielded the largest number of cases (19.2 per cent.); in succession followed the fifth year (18.4 per cent.), the fourth (16 per cent.), and the

second (12½ per cent.). The frequency diminished after the fifth year; there were few cases after the tenth year. One case occurred at eighteen. Of the total 510 cases tracheotomy was performed in 408. The indication for operation was based upon the setting in of symptoms indicative of threatening asphyxia, when marked stenosis, with retraction of the walls of the chest, paroxysms of suffocation, restlessness and fear on the part of the child, and cyanosis, were already present and threatened to pass into asphyxia. In only 14 cases was inferior tracheotomy undertaken; in the remainder, superior tracheotomy or cricotracheotomy was performed. Of the 102 cases not operated upon, the mortality was little more than 10 per cent. The frequency of operation increased progressively from the second to the seventh year of life. Of the 408 cases operated upon, death took place in 249 (61 per cent.), recovery in 159 (39 per cent.). A careful study was made of the records of 190 cases operated on from 1884 to 1891. Of these cases 121 (36.4 per cent.) terminated in death, 69 (63.6 per cent.) in recovery. In 121 cases of the 190, the pharynx was involved upon first observation; of these 77 (63.6 per cent.) terminated fatally. In 24 cases the nares were involved; of these 21 terminated fatally; of 45 cases in which the trachea, as well as the larynx, was affected, recovery took place in 20 (44.4 per cent.). In only 1 case of laryngeal diphtheria was there extension to the middle ear, by way of the Eustachian tube. Of 30 cases in which dyspnoea persisted after tracheotomy had been performed, death took place in 28. In the 190 cases croupous membrane was expelled immediately after the operation in 80, of which 51 (63.7 per cent.) terminated fatally. In the cases successfully operated on, the cannula was removed in 2 on the third day; in 14 on the fourth day; in 4 on the fifth day; in 13 on the sixth day; in 6 on the seventh day; in 5 on from the eighth to the tenth day; in 3 from the eleventh to the fourteenth day; in 7 during the second week; in 5 at later periods; in 1 case the cannula was retained until the forty-ninth day. Difficulty in glutition, as an expression of palsy of larynx and pharynx from diphtheritic infiltration, was observed in 21 cases. In 63 cases diphtheritic involvement of the operation wound was observed; 39 of these terminated fatally. Hæmorrhage from the wound took place in 28 cases, of which 14 proved fatal. Cutaneous emphysema occurred in 2 cases, both of

which terminated fatally. Albuminuria was present in 67 cases, of which 46 (68.6 per cent.) terminated fatally. During the years 1890 and 1891 intubation was practiced in 34 cases of diphtheritic croup. Cases were selected in which the larynx was almost exclusively the seat of disease. In 10 cases it was necessary to perform secondary tracheotomy; of this number all but 1 terminated fatally. Of the others, 14 went on to recovery.

Among the advantages of intubation is the fact that a bloody operation, with its dangers, is avoided; narcosis is not required, nor is skilled assistance; the operation is performed more rapidly, and in many cases with greater ease; when intubation is performed, the inspired air is warmed and rendered moist before it enters the lungs; in favorable cases recovery takes place in a much shorter time than after tracheotomy. Intubation, on the other hand, presents difficulties in after-treatment and in the administration of nourishment that are not present in cases in which tracheotomy has been performed. A disadvantage of intubation is, that it fails to afford adequate outlet for air and membrane. The conclusion is finally reached, that the sovereign remedy for diphtheritic stenosis of the larynx is tracheotomy. Intubation will find application in cases in which the diphtheritic process is confined almost exclusively to parts within reach of the tube; should the breathing not become free, the diphtheritic process spread downward, or interference with the taking of nourishment be pronounced, secondary tracheotomy should not be too long deferred.

Brilliant results may be attained by intubation in cases of chronic stenosis of the trachea, especially if dependent upon the presence of granulations following tracheotomy. Tracheotomy alone is justifiable in cases of oedema of the larynx and stenosis of the deep portions of the air-passages beyond the reach of the tube.

Laryngeal Spasm.—Under the heading, "A Case of So-called Laryngeal Vertigo," I. Adler, of New York,¹ reports a case in which spasmotic cough frequently produced sudden loss of consciousness, without vertigo, and which was cured by clipping an elongated uvula. Quite a full summary of the literature of laryngeal vertigo follows the description of the case, which occurred in a gouty man 53 years of age. Attention is directed to the fact that in all the

recorded cases, except one, the patients have been males, most of whom had passed their fortieth year before their first attack. Oppenheim,⁷⁵ reports (cited by Baginsky^{4, nos. 7, vi}) a case in which there was a tumor, the size of an egg, in the cerebellum, with marked flattening of the pons and of the medulla oblongata. The roots of the vagus and of the accessorius were very hyperæmic, with numerous bleedings and a rather well-advanced atrophy. During life there had been trembling of the head and of the upper extremities on voluntary movements only, but there had been a continuous rhythmic tremor of the soft palate, as well as of the outer and inner musculature of the larynx. The larynx was continuously drawn up and lowered. The rhythmic contraction of the cricothyroid muscle could be felt externally; and on laryngoscopic inspection continuous tremblings (Zuckungen) of the inner laryngeal muscles and the movements of the arytenoid cartilages could be seen. These manifestations, which produced disturbances in glutition, as well as in speech and voice, had been observed, in varying intensity, for a period of about two months.

In an article on the trembling of the vocal bands and the disorders of phonation in disseminated sclerosis of the spinal cord, M. J. Collet, of Lyons,³⁷ who reports an instance in Garel's clinical service, presents a summary of similar cases previously reported, and makes some general observations. The functional disorders of the laryngeal muscles are: a monotonous and scanning voice, brusque change of tone, elevation of pitch, impossibility to maintain the same note for a long time, stridulous inspiration interrupting laughter or weeping, paralysis of some of the muscles of the larynx, and, finally, the tremulousness of the vocal bands. These phenomena may be combined, may exist isolated, or may succeed each other, as in the case related.

B. Baginsky, of Berlin,^{4, nos. 40, vi} exhibited before the Hufelandschen Gesellschaft an interesting patient, who, since 1859, had been the subject of a number of interesting observations by R. Remak, Hertel (1862), P. Guttmann (1869), A. Bamberger (1882), and L. Landau and E. Remak (1883). She came under Baginsky's care in 1889, for a chronic laryngeal affection with hoarseness. The patient, when 15 years of age, had been wounded with a stone thrown against the right side of the forehead, and suffered for six weeks with symptoms of inflammation of the brain.

In the same year she had pneumonia, and repeated recurrent haemorrhages. When 20 years of age pains in the abdomen occurred, and paralysis and insensibility of the left leg, so that she could neither stand nor walk. The paralysis gradually subsided under electric treatment, so that the patient could get about again on crutches. When 29 years of age intermittent and very obdurate aphonia set in for the first time, and somewhat later paroxysms of dyspnœa, frequent emesis, spasmodic cough, and sometimes convulsions. At the same time a left-sided ovarian tumor developed. The spasmodic manifestations receded under Remak's treatment. In May, 1862, photophobia and severe duplex blepharospasm set in suddenly, and these ceased after a nerve-section practiced by von Graefe. After further frequent repetitions of the previous disturbances, and which always subsided temporarily, the patient, in 1882, again had almost complete aphonia, very marked dyspnœa, and very much accelerated respirations. Laryngoscopic inspection revealed impaired approximation and tension of the vocal bands in phonation as the cause of the aphonia. In addition to the aphonia, she had nausea, emesis, and a series of abnormal sensory and motor disturbances, especially on the left side, with left hemianæsthesia. Ovariotomy was performed by Landau in 1882, with negative results. All the neurotic symptoms remained, and some of them increased in intensity. When sent to Baginsky's clinic, the only subjective symptom complained of was the hoarseness. Laryngoscopic examination disclosed the usual evidences of chronic catarrh, with special implication of the posterior wall of the larynx, and moderate impairment in the adduction and tension of the vocal bands. In addition, there was a unique spasmodic movement of the vocal bands during the expiratory phase of the respiratory movement, which numbered some 52 to 54 in the minute, with a pulse of 92. This movement was a constant, almost regular, clonic spasm of the vocal bands and arytenoid cartilages, recurring some 50 to 54 times in the minute. The short adduction movements brought the vocal bands to about the cadaveric position, but no further. They followed rather regularly at the close of the expiratory movement, and were in part associated with it, but they did not extend into the inspiratory movement. Rapid respiration and voluntary inspiratory stridor arrested the clonic spasm for a few minutes, after

which it recurred with greater intensity. This condition has continued constant for two years without any modification, and despite all therapeutic interference. It is the first case of continuous clonic spasm of the larynx on record, and for which, as a special manifestation of hysteria, Baginsky suggests the term "nystagmus of the vocal bands," analogous to nystagmus of the eyes.

Interericothyroid Laryngotomy.—Our corresponding editor, de la Sota, calls attention to some observations by Cisueros,⁵⁰³ Dec. 29, '91 who prefers this operation to tracheotomy as much easier and safer in many instances, especially in subjects whose tracheas lie very deep, or are imbedded in infiltratory products, in cases of tumors of the thyroid body, and in tumors and foreign bodies at the glottis or in the supra-glottic region; in general, in all cases in which the infra-glottic region is free and not liable to subsequent invasion.

Extirpation of the Right Side of the Larynx.—Kulenkampff and Noltenius report⁴ a case of carcinoma of the right vocal band for which unilateral laryngectomy was performed by Kulenkampff. The progress of the disease is well shown and illustrated, as is the laryngoscopic image taken six months after the operation.

Death from Heart-Failure After Extirpation of the Larynx.—M. Grossmann⁸⁴ has been conducting some experiments to determine the cause of death from cardiac deficiency setting in after a few days of satisfactory progress in cases of extirpation of the larynx. He inclines to the belief that irritation of the central ends of the severed superior laryngeal nerves, possibly excited by the antiseptic dressings, may be regarded as the cause, or perhaps a neuritis may be developed in the central portion of the severed nerve. A marked increase ensues in the arterial pressure, producing repletion and distension in the large arteries and in the left ventricle.

Tracheotomy.—Von Doukoff⁵⁰, Jan. 25, Apr.¹¹ records a case in which he maintained patency of the opening made in the performance of tracheotomy, by applying a ligature to either side of the incision and fastening the ends behind the neck. The after-management was exceedingly simple. Any membrane that presented itself was removed by means of a dull forceps. Korolew²¹ holds that the

difficulty of swallowing, observed after the performance of tracheotomy in cases of diphtheria, is dependent upon the rigid infiltration of the muscular apparatus of glutition and of the epiglottis, and not upon paralysis. As the introduction of a tube into the stomach through the mouth is attended with certain difficulties, the expedient was employed of introducing the tube through the nares, fastening its outer extremity to the cheek by means of adhesive plaster, and closing the opening when the tube was not in use. Clegg, of Liverpool,², cites the case of an infant, 4 days old, in which tracheotomy was performed for the relief of respiratory obstruction, dependent upon the swelling of the tongue, in consequence of the presence of a nævoid mass beneath. The child had at first breathed through the nose, but this subsequently became obstructed from swelling of the mucous membrane. The child did well for about thirty-six hours after the operation, and was able to take a little nourishment, but died with symptoms of pulmonary consolidation. Mahot, of Nantes¹²⁷, reported the case of a child, 10 years old, in imminent danger of suffocation in the course of an attack of croup, and presenting extensive subcutaneous emphysema of the neck, chest, and abdomen. Tracheotomy afforded relief from the respiratory difficulty. Twelve or thirteen days elapsed before the disappearance of the emphysema. In the mechanism of its occurrence it was thought to be secondary to the development of an interstitial pulmonary emphysema. Mayer⁹⁴ has made a study of 316 cases of diphtheria in which tracheotomy was performed; in 103 recovery ensued. Neither the character of the primary disease, extension to the bronchial tubes, nor the existence of pneumonia is considered a contra-indication for the operation. Children under one year are unfavorable subjects. The earlier the operation is performed, the better. Only children *in extremis* were operated upon without chloroform narcosis, which did not appear to exercise any harm, even in cases characterized by advanced carbonic-acid poisoning. In cases of urgency, it may be justifiable to make a transverse incision into the trachea. For removing the membrane forcible artificial respiration usually sufficed; suction was seldom practiced. Intubation was practiced in 9 cases; in 6 of these secondary tracheotomy became necessary. Tracheotomy is considered the easier and simpler operation, both for the patient and physician.

Soupault¹¹⁸ reports forty-five cases of tracheotomy, with 46 per cent. of recoveries. This good result is largely attributed to the employment of creasote. The drug was administered in full doses and a bit of cotton impregnated with a solution (1-30) in alcohol and glycerin was placed over the orifice of the tube. Martha, of Paris,¹³⁶ reported the cases of two children, 7 and 5½ years old respectively, in which tracheotomy had been performed during attacks of croup. When, after the primary disease had disappeared, attempts were made to remove the cannula, such marked interference with respiration ensued that the tube had to be replaced. Examination of larynx and trachea failed to detect any abnormality, but in both instances the vault of the pharynx was occupied by large masses of adenoid growths, after the ablation of which there was no further difficulty in the removal of the cannula. Harvey,¹ records the case of a boy of 8 years, thought to be dead in the course of diphtheria of the larynx, in which the breathing and the heart-beat were resumed after the performance of tracheotomy and the introduction of the tube. The child appeared to do well for a short time, but death took place, quite unexpectedly, twenty-nine hours after the operation. Thost, of Hamburg,³⁴ recommends that, in cases of tracheotomy for croup and diphtheria and for foreign bodies in the larynx, an attempt be made tentatively, on the third and fifth days, to remove the cannula, in order to avoid the risk of stenosis from granulations, which, together with cicatrices, he considers the most common cause of difficulty of removing the cannula. Fraenkel, at the same society, called attention to stenosis following measles, in consequence of perichondritis and necrosis of the arytenoids. In his experience, granulations have never given rise to stenosis. On the contrary, he has many times found granulations in the absence, during life, of symptoms of laryngeal obstruction. On the other hand, he has frequently found fatty degeneration of the posterior arytenoid muscles.

Tracheotomy-Tube Worn for Twenty-eight Years.—Lewin, of Berlin,⁶⁰ cites the case of a woman who had worn a tracheotomy-tube for twenty-eight years. The operation had been performed for the relief of dyspnoea, which was found to depend upon the presence of a tumor upon the right side of the posterior wall of the larynx, with which were associated swelling of the vocal bands,

the ventricular bands and the epiglottis, and enlargement of the veins at the root of the tongue. Tracheotomy was followed in due time by laryngo-fissure and extirpation of the growth. The tube could be dispensed with when the woman remained quiet in the sitting posture, but had to be worn when the recumbent posture was assumed during sleep. There had been no complication during the many years in which the tube had been worn.

New Instruments for Tracheotomy.—Hastings, of Shadwell,² has described a simple and economical form of tracheotomy-tube, for use after the track has become fairly well established by the wearing of a silver tube for two or three days. An oval opening is made on one side of a piece of rubber drainage-tube, the shorter diameter of the opening involving about half the circumference of the tube. A longitudinal slit is made in the plane of the opening, extending from the extremity of the tube to within about a quarter of an inch of the opening, and a second slit is made directly opposite, the distance varying with the depth of the wound into which the tube is to be introduced. In the lateral flaps thus made, holes are cut for the insertion of tapes. The portion of tube beyond the oval opening, which is to be introduced into the trachea, should be rather longer than the vertical part of a metallic tracheotomy-tube. In introducing the tube the opening is turned upward toward the posterior wall of the trachea; the part below then lies in the trachea without any tilting. Among the advantages claimed for the tube are (1) that it fits the trachea well, being angulated instead of curved, so that tilting cannot occur; (2) laryngeal respiration can take place through the window as soon as swelling has subsided sufficiently for the glottis to be patent; (3) the cost is insignificant; (4) its accessibility.

Foltanek, of Vienna,³⁰⁶ divides the hæmorrhages that occur after the performance of tracheotomy into two classes. The first includes those that take place immediately in the train of the operation; these are the less frequent and the less dangerous. They usually occur several hours after the operation, and result from defects in ligation of bleeding vessels or from tears made by tenacula in the capsule of the thyroid gland; or they may be parenchymatous and dependent upon increased arterial pressure, in conjunction with imperfect aeration. This form of hæmorrhage is to be avoided by the adoption of obvious precautions. It is to

be treated by gauze-packing, by the removal of obstructions in the air-passages, and, if need be, by the application of a ligature. The haemorrhage that occurs later in the course of a tracheotomy is the more common and of the greater significance. Among other causes, it may depend upon diphtheritic or phlegmonous involvement of the operation wound; upon inflammatory changes in the walls of the blood-vessels; upon ulceration induced by the pressure of the cannula; upon the detachment of firmly-adherent membranes or ulcerous mucous membrane; upon the presence of granulations. Diphtheria of the operation wound is believed to be exceedingly uncommon; phlegmonous inflammation much less so. In the prevention of the latter the tracheal incision is to be made as high as practicable, crowding is to be avoided, and as full a supply of fresh air as possible is to be insured. Ulceration of the tracheal mucous membrane from the pressure of the trachea is to be avoided by the employment of a modification of Durham's cannula attached to a movable shield and capable of being depressed or withdrawn, so that the point of contact with the mucous membrane may be changed from time to time. A portion of the inner tube is made of a flexible spiral, so that its curve may conform accurately with that of the outer tube. If the bleeding be extra-tracheal, it may be controlled by a packing of tannated iodoform gauze; if intra-tracheal, it may be necessary to introduce into the trachea a cannula wrapped with gauze. If the child is able to expel the clots it is kept at rest; otherwise, aspiration is cautiously practiced. Small doses of morphine may be indicated to control restlessness. To facilitate the introduction of the cannula after denudation of the trachea, Glover⁸⁷ has devised an instrument which consists essentially of a cannula armed with a hollow trocar, bearing lateral perforations at the point and head to permit free circulation of air, while the thumb occludes the mouth of the instrument during introduction. The retraction of the trocar is effected by a spiral spring, its projection by slight pressure. The trocar is, at the proper time, removed and replaced by an inner cannula of the same calibre. Péan¹⁰, calls our attention to the resemblance of Glover's instrument to his own, except that the latter sharpens the beak of the hollow pilot, in order to convert it into a tracheotome,—a procedure Péan condemns as endangering the posterior wall of the trachea.

THE TRACHEA.

Tracheitis.—Lubet-Barbon and Alfred Martin³² extol inhalations of hot menthol-vapor from a flask with two openings, the vapor being evolved by placing the lower portion of the flask in a vessel of warm water, or by carefully warming the flask over a lamp. Six or seven inspirations are to be taken at a time, and this repeated every few hours. It is contended that the menthol, being heated to a temperature greater than its point of volatilization, becomes deposited in its natural form upon the walls of the trachea.

Abscess of the Trachea.—At the annual meeting of Belgium Laryngologists and Otologists at Liége, June 5, 1892,¹¹ Hicquet recorded an instance of this rare lesion in an emaciated man, about 36 years of age, who had resided in the Island of Borneo for several years, and who had a cough with scanty expectoration of mucus. No pulmonary disease was evident on auscultation, and there were no glandular swellings in the neck. The left vocal band was seen to be paralyzed. Suddenly a suffocative paroxysm occurred, with free inspiration and impeded expiration, as though a growth had suddenly projected into the passage so as to obstruct it. By laryngoscopy the upper three rings of the trachea could be seen free from any evidence of tumor, and the next day there was a sudden expectoration of pus mixed with air-bubbles, and the respiration improved greatly. The patient died two days later, of an enteritis which had existed for a long time. An autopsy could not be obtained, and thus the diagnosis of abscess of the trachea could not be confirmed.

Compression of the Trachea.—It is well known that severe dyspnœa is occasionally produced by compression of tumors outside the air-passages. A case in point, producing stenosis of both larynx and trachea, has been reported to F. Schiffers,¹³⁶ due to an extensive carcinoma in the mediastinum which had invaded the left bronchus, the pericardium, and the vessels at the base of the heart. At the laryngoscopic examination, six days before death, there was complete immobility of the left vocal band and luxation forward of the corresponding arytenoid cartilage. The patient had been able to work until within two or three weeks. Dyspnœa had existed for three months and hoarseness about two months and a half. There was no loss of appetite and no cancerous cachexia. Tumefied and hardened glands existed in the subcla-

vicular regions, the left more especially, and in the left retromaxillary region. The diagnosis had been made, chiefly by exclusion, and based upon the enlarged gland in the neck and especially those in the left subclavicular fossa.

Syphilitic Stenosis of the Trachea.—Lubliner ⁵⁵¹_{No. 13, 15}, ¹¹_{Sept.} reports two fatal cases of tracheal stenosis, which he attributes to late hereditary syphilis. In the case of a man, 24 years of age, temporary improvement was brought about by dilatation with Schroetter's tubes. Medicinal treatment had no effect. In a boy of 17 years, medicinal treatment and tracheotomy were helpful for a short time only. A third case, in which transillumination was of diagnostic use, is alluded to.

THE OESOPHAGUS.

Diverticulum of the Oesophagus.—Kocher, of Berne, ²¹⁴_{Apr. 16} reports two cases of oesophageal diverticulum, both of which were successfully treated by operation. The first was in a man of about 36, who had suffered with nausea, vomiting, eructation and colicky pain for a period of twenty years. There was a sense of obstruction of food on the right side of the oesophagus. Emaciation and anaemia became quite marked. A diverticulum of the oesophagus being diagnosticated, an operation for its relief was undertaken. The pouch was found behind the trachea, and connected by a pedicle with the left side of the oesophagus, at the level of the cricoid cartilage. A provisional ligature was applied to the pedicle, close to its root; then the adventitia and the muscularis were dissected away and the mucous membrane exposed. To the latter, as close to the sac as possible, a ligature was applied, and a little beyond a second ligature; the thermo-cautery was applied between the two. The margins of the muscular and adventitious coats were now approximated over the mucosa and sutured. The stump was dressed with iodoform gauze. The patient was for several days nourished by means of enemata, and recovered without noteworthy drawback. In the second case the symptoms had been present for eight years. The treatment and the result were practically the same as in the first case. It is suggested that, in addition to other causes of the formation of diverticula of the oesophagus, repeated vomiting may act as an exciting factor, as the constrictor of the pharynx is situated at about the level of the cricoid cartilage (which is the usual seat of the diverticula), and the oesophagus is more

dilatable below this point than elsewhere. This view is supported by the history and by the constitution of the diverticula in the two cases reported.

V. Bergmann²²⁶ reported the case of an anæmic woman, 38 years old, who during the first year of life had suffered with suppuration of the neck, a quantity of pus from time to time escaping from a fistulous opening. This fistula was made to close during the second year by means of an operation. For four or five years there had been some difficulty in glutition, at first slight, but subsequently more marked. Digestion was deranged. The taking of food was followed by eructation and vomiting; there was, at the same time, a sense of swelling of the neck, though there was no appreciable enlargement on palpation. The woman herself was sometimes able to pass a tube into the stomach, though not always. Nothing abnormal was detected on auscultation. The thyroid gland was enlarged. Firm pressure upon the left side of the neck, as well as inclination of the head to the left, facilitated the descent of ingested food. A diagnosis of an oesophageal diverticulum was arrived at. As the nutrition was seriously impaired and treatment by means of the sound was impracticable, and as the prognosis of cases of the kind is unfavorable, it was decided to attempt excision of the pouch. An incision was made along the anterior border of the left sterno-mastoid muscle, from the level of the hyoid bone to the clavicle. The omohyoïd muscle was severed, the superior and inferior thyroid arteries and some veins ligated and cut, and a search made in the retrovisceral space for the diverticulum. This hung from the oesophagus like a small pear. It was removed and the opening in the mucous membrane closed by suture. Only the lower third of the wound was closed, the upper portion being packed with iodoform gauze. The patient was given water immediately after the operation. On the sixth day milk escaped from the wound. A small fistula that remained was made to close by means of the actual cautery. The entire wound was closed at the end of sixteen weeks. After the lapse of a year there was no difficulty in swallowing. The pouch had a muscular covering, and was probably congenital in origin.

Stricture of the Oesophagus.—As a substitute for solid sounds employed in temporary dilatation of strictures of the oesophagus, Rosenheim²²⁷ has devised a metallic sound of rolled tin cut in

spirals. The flexible portion of the sound is forty-four centimetres long, so that it can be introduced to the cardia. The sounds may be made of any size, and have met all the requirements. They are readily introduced, easy of manipulation, and absolutely clean. The instruments are so constructed as not to cause irritation or nipping of the mucous membrane of the oesophagus. They can be readily cleansed.

Carcinoma of the Oesophagus.—Page, of London,²² describes two cases of carcinoma of the oesophagus. The one occurred in a man, 54 years old, in whom gastrostomy was performed in two sittings. The patient died a month later. At the post-mortem examination a mass of growth an inch and a half long, hard and ulcerated on the surface, was found occupying the circumference of the oesophagus, at the level of the bifurcation of the trachea. At the cardiac extremity of the stomach was a similar growth. Between the growths the mucous membrane on the summit of the rugæ contained numerous areas of carcinoma, varying in size from a mere point to a small bean, and mostly linear in shape and direction. At the lower extremity of the oesophagus was a mass of carcinomatous glands that had spread into the mucous membrane of the stomach, and there were also nodules in the liver. The second case occurred in a man, 55 years old, who presented the symptoms of tuberculous disease of the cervical vertebræ. The head was inclined forward; the chin rested on the sternum; at the back of the neck was a projection seemingly caused by the forward inclination of the spine. Movement caused pain, especially in the course of the major and left minor occipital nerves. There was some anaesthesia behind the left ear, and swallowing caused pain referred to the back of the neck. There was no evidence of obstruction of the oesophagus. Loss of power in the extremities developed, and there was retention of urine. The man failed progressively and died. At the post-mortem examination a typical epithelioma was found involving the whole circumference, but not narrowing the lumen of the oesophagus, at a level with the arch of the aorta, to which the growth was adherent. Posteriorly the growth was adherent to the third and fourth dorsal vertebræ, the bodies of which were infiltrated by it. A mass of epithelioma had made its way through the intervertebral foramen on the right side into the spinal canal, and the cord was softened at this place.

Foreign Bodies in the Oesophagus.—Beugnies, of Givet,²⁷⁸ succeeded in removing, from the oesophagus of a woman, a pin that had been swallowed, but was not within reach, by having her swallow a tangled and knotted mass of thread and then a few gulps of water. The foreign body came away in the midst of the thread. McCartney, of Chungking,²⁸⁵ records the case of a man, 24 years old, who unconsciously swallowed a silver dental plate to which a single tooth was attached. An emetic was administered, but neither plate nor tooth was expelled. Laryngitis, with hoarseness and pain, particularly on swallowing, developed in the course of two months. A bristle probang encountered the obstruction two and a half or three inches from the posterior pharynx. After expanding the probang to its utmost and exerting considerable traction the plate was withdrawn, and there were no further complications. Schifflers²⁸⁸ reported the case of a young man of 16 years, by whom a Belgian two-franc piece had been accidentally swallowed and had become impacted in the oesophagus. The coin could be appreciated by palpation, but could not be seen or reached. The man was given a diet of potatoes, and castor-oil was administered. After four days of treatment, the coin was expelled by the bowel. The opinion is expressed that, in cases in which foreign bodies have become lodged in the oesophagus, external oesophagotomy should be practiced as early as possible when the body cannot be removed speedily and readily, and especially if its surface be rough or present sharp points. Beco added the report of a case of a child of 10 years, that had swallowed a French sou, and for two weeks suffered incoercible gastralgia and vomiting. The coin, corroded by the gastric juice, was finally ejected with a meal.

Williams, of Manchester,² reported the case of a man, who, after eating a chop, experienced pain in swallowing. Examination made after three days, by means of the finger and the horse-hair probang, failed to disclose the presence of a foreign body. Six days after the accident the man was feeling much better, although swallowing was still attended with pain. On the seventh day, in the morning, there was slight expectoration of blood; about midday a large quantity of arterial blood was thrown up and death followed immediately. At the post-mortem examination a perforation was found on either side of the oesophagus, at the same

level, that on the left piercing the aorta an eighth of an inch above the first right intercostal branch.

Brown, of London,¹¹ describes the case of a man of 36, who, three and a half years previously, while drinking a glass of water, swallowed a vulcanite dental plate to which two artificial teeth were attached. Several unsuccessful attempts were, at the time, made to remove the foreign body, and the man was led to believe that it had been forced down into the stomach. Shortly afterward progressive hoarseness appeared. There was also difficulty in swallowing, and the breath became offensive.

On laryngoscopic examination the left vocal band was found in the position of adduction, the larynx appearing otherwise normal. An oesophageal bougie encountered resistance at a point about eight inches from the margin of the teeth, although the instrument eventually passed to a distance of fourteen inches. With a metal-tipped bougie a foreign body was struck at a point about two inches below the level of the cricoid cartilage, to the left of the median line, where it could also be felt by external manipulation. The man having inhaled sufficient chloroform to overcome spasm, the plate in the oesophagus was dislodged by means of a "coin-catcher." An assistant grasping the throat so as to fix it, the plate was drawn into the pharynx, where it was seized with a pair of "crocodile forceps" and removed. A recent fracture indicated that a portion had been left behind, and this was at once removed by means of an "umbrella probang."

Gerster, of New York,¹² expresses the opinion that, while the shape and size of a foreign body impacted in the oesophagus holds an important relation to the ultimate issue, the length of time during which the impaction continues is of much greater consequence. Pressure will give rise to ulceration, and this in time will afford a port of entrance for infection. Phlegmonous processes, accompanied by sloughing, will lead to perforation into adjoining organs or cavities, such as the trachea, the pleura, the lungs, the mediastinum, or the large vessels. The conclusion is arrived at that if a foreign body become lodged in the oesophagus and cannot be displaced downward into the stomach or extracted without the employment of an undue amount of force, immediate external oesophagotomy is indicated. Early operation is safe; late operation is dangerous and often useless. Delay beyond

twenty-four hours is never justified. Tedious and repeated attempts at dislodgment, when impaction has existed for more than twenty-four hours, are very likely to prove more dangerous than oesophagotomy. In operating, blunt methods of division are to be avoided. An ample incision should be made just in front of and parallel with the anterior border of the left sternomastoid muscle, beginning a little below the level of the cricoid cartilage and extending to the sternal insertion of the muscle. The omohyoid is drawn aside and the lateral margin of the thyroid gland is exposed, to serve as a guide. The large vessels within their sheath are, together with the sternomastoid muscle, drawn backward and aside. Dissection should be proceeded with mouse-tooth forceps. The vessels crossing the line of the incision are to be secured with ligatures and cut. Should the sternal portion of the sternomastoid be in the way, it is to be cut. The recurrent nerve is not to be injured. The oesophagus can be recognized by the longitudinal direction of its fibres or by means of a bougie or catheter introduced within its lumen. It is incised between two small, sharp retractors, and fillets of silk are passed through the margins of the incision. After the object of the operation has been accomplished, if there be no septic complications, the edges of the oesophageal wound should be stitched with fine silk. The outer wound is packed loosely with iodoform gauze. A few silk-worm-gut sutures may be introduced into the edges of the wound in the skin, which is, however, only to be closed after the packing has been removed. Alimentation by the mouth may at once be begun, or the patient may be fed by means of a tube or by rectal injections.

Richard R. Leeper², reports the case of a lunatic who swallowed a large teaspoon, which was removed with forceps. Moulouguet and Bennezon²³⁰ report a case in which a dental plate in the oesophagus was driven into the stomach by the patient's efforts, during the short interval between its detection by sounding and the introduction of an instrument for its extraction. It passed the alimentary tract safely.

INTUBATION OF THE LARYNX.

BY J. O'DWYER, M.D.,
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A NOTICEABLE and commendable feature of the literature of intubation during the past year has been a considerable reduction in the number of papers, based on very little or no practical experience with the operation, that have been published. The technique of intubation is so difficult to acquire, and the disease for which it is principally employed is so complex in its nature, that the experience derived from a few cases is of little or no value, and may be misleading. For this reason, as well as on account of the limited space at my disposal, no report that deals with an individual experience of less than fifty cases of croup will be referred to in this article. In a recent paper read before the New York Academy of Medicine, ⁵⁰ Waxham, of Chicago, reports 421 cases intubated for croup, with 146 recoveries, or 34.6 per cent., which is the largest individual experience with the operation and the best results so far reported. The other extreme, as far as results are concerned, will be found in a paper by R. W. Lovett, of Boston, ⁹ entitled "Intubation *versus* Tracheotomy," at the Boston City Hospital. Three hundred and ninety-two intubation cases are reported, with a recovery percentage of only 20.4, while tracheotomy, with 327 cases, gave 29 per cent. Average results can never be obtained by the method adopted at the Boston City Hospital, where the members of the Resident Staff do the intubations in rotation, the service changing monthly. No single individual ever gets a sufficient amount of practice in this way to acquire the manual dexterity and educated touch that are absolutely necessary to operate without immediately endangering life. The many failures to intubate, together with the large number of accidents reported which do not belong to the operation when skillfully performed, are amply sufficient to explain the unusually bad results obtained in that institution. In hospital practice,

where the consent to do tracheotomy need not be asked, this operation should always be selected in preference to intubation, unless the latter can be performed by one or two operators for at least one year, a thorough training on the cadaver to precede any attempt to intubate the living. When the important fact shall have been generally recognized, that intubation without such training is a dangerous operation to attempt, better results will be obtained and very few accidents will occur.

As an example of the dangers attending intubation in the hands of those having only a limited experience with the operation, however skillful they may be, as surgeons, laryngologists, etc., I will quote the following case, reported by G. Hunter Mackenzie, of Edinburgh²²: "Case X. Girl, aged 2 years, under the care of H. Hay. Diphtheria of the pharynx and larynx. At 11.30 P.M. the pulse could not be counted and great inspiratory dyspnoea was present. Intubation was at once performed, with immediate and marked relief to the breathing and slowing of the pulse. February 4th, the child has breathed freely all day and is apparently going on well; she had slept well during the night; brandy is being freely administered; a moderate degree of difficulty in swallowing is present. February 5th, the child continues to do well; at 4 P.M. I considered it advisable to remove the tube, which had been forty hours in the larynx, and this I tried to do with the assistance of the child's father; the process of gagging and the insertion of the extractor, along with some struggling on the part of the little patient and some difficulty in locating the blades of the extractor inside the very small tube, appeared to completely exhaust the patient and induced a condition of death-like collapse; artificial respiration was immediately resorted to and produced a partial revival only, for the child never returned to her former condition. She died a few hours afterward, without a recurrence of the symptoms of obstructed respiration." Death in this instance was from apnoea, the result of prolonged attempts to remove a tube from the larynx of a child free from dyspnoea at the time the operation was begun. How much more liable is this accident to occur during the introduction of a tube when the dyspnoea is often extreme! In untrained hands a fatal result from this cause, both in the insertion and extraction of a tube, is not by any means rare, but the real cause of death under these circumstances seldom gets into print.

An experience of this kind only serves to emphasize the necessity for an ample amount of practice on the cadaver before attempting to operate on the living, and for a better knowledge of the after-treatment of intubated cases. There was not one chance in twenty that the tube could have been permanently dispensed with in so young a child, after its retention in the larynx for only forty hours, and, without some special indication for its removal, it should have been allowed to remain for six or seven days.

Bokai, of Budapest, and others who make a practice of frequently removing the tube, do so by means of the string which is always left attached, which entails neither danger to life nor injury to the larynx. B. P. Goode, of Cincinnati, O.,⁵³ reports 56 intubations, with 32 recoveries.

Gulatti, of Italy,⁴¹ has performed fifty intubations for croup, and states that the operation gives about the same results as tracheotomy. He believes that intubation is an easy operation to perform, and can be done by any one possessing an ordinary amount of manual dexterity, even without an assistant. F. Egidi, of Rome,⁴¹ during the epidemic of 1891, had a mortality of 80 per cent., with both intubation and tracheotomy, in an experience of 60 cases with one operation and 61 with the other. In a previous epidemic he had obtained 19 recoveries in 31 cases by means of tracheotomy. Egidi prefers intubation.

CHRONIC STENOSIS.

C. H. Knight, of New York,⁹⁹, reports a case of chronic stenosis, subglottic, in a boy aged 10, in whom intubation was resorted to for the relief of urgent dyspnoea. The tube was worn intermittently, and with comfort, for three months. When thyrotomy was performed in order to remove the obstructing neoplasm, if such were found to be the cause, death followed very rapidly from general tuberculosis. Knight notes the following points of interest: 1. The simplicity of intubation, as compared with tracheotomy, and the ease with which the tube was extracted with the aid of cocaine and under the guidance of the mirror. 2. The slight amount of disturbance excited by the tube and the absence of objection to its prolonged retention. He believed that the patient was much more comfortable than he could have been with the tracheal cannula.

V. Nicolai, of Rome,⁶⁵⁶ reports five adults treated by intubation, in four of whom the stenosis was due to tubercular laryngitis, while one followed the removal of a foreign body which had remained in the larynx for a long time. The tubercular cases were complicated with pregnancy, and relief to the laryngeal dyspnoea, all that was expected, was accomplished by intubation. The traumatic case developed perichondritis, with burrowing of pus downward as far as the bifurcation, followed by haemorrhage, which proved fatal. This might have been the result of the foreign body or from the pressure produced by using too large a tube.

E. Schmiegelow, of Copenhagen,²⁰⁶⁰ reports eight cases of chronic stenosis of the larynx treated by intubation, which are of great interest:—

Case I.—Boy, aged 7 years; high tracheotomy for croup, followed by complete occlusion of the larynx. The adhesions were broken up from below and several attempts were made to intubate, but the distal end of the tube engaged in the lower angle of the wound, beyond which it could not be passed. A curved tube, with convexity forward, was then constructed and inserted. At the time of report the patient had worn the intubation cannula, which was removed every five or six weeks, for over eight months, and was still under treatment.

Case II.—Boy, aged 6 years; retained the tracheal cannula for over two months. When cannula is removed and external wound closed, no air can be forced through the larynx. Intubated, and fistula allowed to close. Cannot do permanently without the tube at the end of eight months.

Case III.—Woman, aged 33 years, who had worn a tracheal cannula for fifteen years on account of neoplasms and general hypertrophy of the laryngeal mucous membrane. About three weeks after intubation, was taken with severe dyspnoea and died before medical aid could reach her. The tube was found obstructed with tenacious, muco-purulent secretion. [It is very rare for an intubation tube to become occluded from secretions in an adult, because any accumulation that interferes with breathing can be readily expelled by a voluntary act of coughing, and instructions to that effect should be given. This is facilitated by the use of sprays or steam. As a further precaution against accidents of this nature the external wound should be kept open by

means of a plug until sufficient breathing-room in the larynx has been secured to sustain life in case the tube is expelled. In one of my own cases a small tracheal cannula was worn at the same time with the tube in the larynx, and this can usually be done in adults when the opening is not too high up or in the larynx proper.—ED.]

Case IV.—Boy, aged 4 years; tracheal cannula retained one month; cured by wearing intubation tube fourteen days.

Case V.—Boy, 2½ years old; intubated to get rid of retained cannula seven months after tracheotomy for croup. About five weeks after intubation the tube was expelled during a violent fit of coughing, and he died from asphyxia before help could reach him. The stenosis in this case was caused by masses of granulation tissue or papillomata in the larynx, which closed like a valve when the tube was coughed out. The same comments apply here as in Case III.

Case VI.—Child, 2 years old; one month after tracheotomy for croup could not get rid of cannula on account of granulation masses above the fistula; intubated and cured in twelve days; tube in this case was coughed out several times, but without endangering life, as there was sufficient breathing-room in the larynx to sustain life until it could be replaced.

Case VII.—Man, aged 24 years; tracheal stenosis following tracheotomy in his sixth year; intubated several times and still under treatment.

Case VIII.—Woman, aged 25 years, suffering from aphonia spastica; intubated twice and tube left in only a few minutes each time, without result. [To accomplish anything in a case of this kind the tube would have to be worn several weeks at least.—ED.]

G. A. Sutherland, of London,⁶ reports a case of bronchiectatic abscess which was produced by a child's intubation tube that was placed in the larynx of a young man aged 17½ years. The string, which was left attached, broke during an attack of coughing, and the tube passed into the trachea. The stenosis, for the relief of which intubation was practiced, was traumatic in origin, and tracheotomy was first resorted to. Why, in the absence of adult tubes, the tracheal cannula was not left in position, does not appear in the report. The tube used in this case is described as No. 3, two and one-fourth inches in length, which is

the size suitable for children between 2 and 4 years of age. In the regular croup set there are three larger sizes than this, and no reason is given for not having selected the largest, the shoulder of which is almost five-eighths of an inch in greatest diameter. The wood-cut accompanying the report shows one of the vile imitations called intubation tubes that can be found almost anywhere in Europe, and which are not uncommon in this country. A point of interest in connection with the subsequent history of this case is the fact that the tube remained in the left bronchus for several months without giving any evidence of its presence. The patient enjoyed such good health that the tube was believed to have been coughed up and swallowed. When the abscess was finally located in the left lung a portion of rib was excised, the cavity opened and explored with the finger, but the tube was not reached. Haemorrhage from this wound hastened the fatal termination.

Pitts and Brook, of London,²⁰⁵¹ narrate the histories of four cases of chronic stenosis of the larynx with retained tracheal cannulas in which intubation was employed:—

Case I.—Boy, aged 3 years. Tracheal cannula worn for three years, during which time the external wound was allowed to close several times and tracheotomy had to be repeated. Dilatation by Macewen's catheters was carefully tried for a considerable period without success. Thyrotomy was then performed and some cicatricial tissue removed, which gave relief for a time, but the cannula had to be replaced. Intubation was finally resorted to, and effected a permanent cure in a short time. It is worthy of comment that the largest intubation tube was used, in this child of three years, without injury to the cricoid cartilage and without discomfort to the patient. This can only be explained by the fact that the cricoid ring was divided by the first tracheotomy and several times subsequently, certainly when thyrotomy was performed, not long before intubation was resorted to, which allowed this naturally narrow and unyielding portion of the larynx to expand and accommodate itself to the large tube.

[In one of my own cases, a boy aged 8 years, cricoid perichondritis with abscess was produced by using too large a tube, but this disappeared as soon as a tube of proper size was substituted. Had the larger tube been allowed to remain long, necrosis of the cartilage would undoubtedly have resulted.—ED.]

Case II.—Boy, 9 years old. Tracheotomy for croup; cannula worn four months; permanently dispensed with by wearing tube in larynx one week.

Case III.—Boy, aged 3 years and 3 months. Tracheotomy for croup, attended with great sloughing of wound, including some of the tracheal rings; intubation intermittently for almost a year at time of report, and still under treatment. The author's comment on this case is as follows: "Much time was wasted in the treatment by not attending to the lesson that ought to have been learned from the first case, namely, where intubation is not at once satisfactory, to explore for and remove, as far as possible, all mechanical obstruction, etc." [It does not seem to me that there is any advantage to be derived from the removal of cicatricial tissue in such cases, unless it interferes with the introduction or retention of an intubation tube of proper size, the gentle, long-continued pressure of the tube being sufficient to stretch and finally overcome the tendency of this tissue to contract.—ED.]

Case IV.—Boy, aged 9 years. Tracheotomy for croup; cannula worn continuously for five years. After about ten months from the beginning of intubation, the tube is inserted at intervals of three weeks.

This was a most difficult case to handle, owing to the distortion of the upper portion of the trachea from the long-retained cannula.

In all the above cases the external opening was kept patent by means of a vulcanite plug attached to a collar, similar to that on the tracheal cannulas.

The difficulty of getting rid of a tracheal cannula usually bears a direct proportion to the length of time that it has been retained. Ankylosis of the arytenoids and atrophy of the muscles that move them, together with general shrinkage of the larynx, take place from long-continued disuse. Recent cases of a month or a few months' standing are usually cured in a short time by means of intubation.

Some modifications of the ordinary croup tubes will often be required in the treatment of chronic stenosis of the larynx in children. For example, in a very close stricture a much smaller tube than that suitable for the age will have to be used in the beginning, in which case a larger head will be necessary to insure

safety, or the one proper for the age or even a size larger may be repeatedly expelled, and, under these circumstances, the retaining swell should be increased rather than the size of the tube. While it is true that larger tubes can be employed in chronic stenosis of a non-cicatricial nature than in croup, the increase should not extend beyond two sizes, as injury to the subglottic mucous membrane, or even to the cricoid cartilage, would be liable to occur. Gradual dilatation in the manner indicated is much safer, and is attended with much less suffering to the patient than forcing in a large tube in the beginning. There is no necessity for haste in the treatment of this class of cases, as the ability to swallow almost perfectly is soon acquired, and the danger of the tube becoming stopped up is very slight. A metallic tube should not be allowed to remain continuously in the larynx for longer than about two weeks at a time, because the calcareous matter deposited on its surface gives rise to considerable irritation, and also for the reason that the points of pressure in the vestibule of the larynx should be changed as often as this by using a tube with smaller, larger, or differently-shaped head. By such precautions the development of granulation tissue, which may be the cause of retained laryngeal cannulas, can be prevented. (See "Intubation," last edition of ANNUAL.) Vulcanite tubes, which are to be preferred in adults, can be worn for a much longer time without change, because no such deposits occur on the surface and secretions are less liable to adhere to the inside.

In this paper I have dwelt particularly on intubation in chronic stenosis, because the value of this procedure in the treatment of this class of cases is beginning to be recognized and serious mistakes are being made. The most important of these have been referred to.

DISEASES OF THE THYROID GLAND.

By J. PAYSON CLARK, M.D.,
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ANATOMY AND PHYSIOLOGY.

G. M. Cullen ³⁶ gives an interesting account of the earlier literature of the thyroid gland. Galen was the only writer of antiquity to mention this organ. Vesalius (1543) was the first among modern physicians to speak of the gland, whose function he thought to be to moisten the orifice of the trachea. Casserius (1600) first described it as a single organ. Fabricius de Aquapendente (1618) was the first to definitely localize it as the anatomical seat of goitre. Wharton (1656) first called it "the thyroid glands." Morgagni ended the controversy as to the duality or singleness of the organ. Haller in 1765 made the gross anatomy of the gland complete. Many strange theories as to its function are mentioned.

M. Podack ¹⁸ concludes that the function of the thyroid is not to store a substance from the blood injurious to the system, but to prepare a material for further employment in the organism. For what use or wherein the preparation consists is not stated. Godart and Slosse ²⁴, have found, on injecting an extract of the thyroid gland into the right external jugular vein of a dog, that the quantity of lymph given off from a fistula of the thoracic duct was nearly four times as much as before. The lymph also became non-coagulable, more aqueous, and less viscous. Hofmeister ³⁴ found, in rabbits whose thyroid gland was extirpated, that the hypophysis cerebri had double the weight of that of normal animals. In the former the development of the bones was also much diminished.

GOITRE.

Etiology.—Koranyi ¹¹ reports four cases of acute inflammation of the thyroid. He is inclined to look upon the affection as of haematoogenous origin. Tavel ²² believes strumitis to be but

one of the sequelæ of some of the more infectious diseases. In eleven cases he found eight distinct varieties of bacteria which had gained access to the gland through the blood. In 18 cases of goitre examined, 3 commenced after gastric catarrh, 2 after typhoid fever, 2 after puerperal disease, 1 after each of the following,—pyæmia, proctitis, pneumonia, angina, coryza,—and 3 unknown. In support of the infectious theory of goitre, which was first proposed by Poncet, Jaboulay and Rivière,²¹, made cultures from six extirpated goitres. They were all fertile. In five staphylococci were found; in one a bacillus not yet clearly determined. These facts show that tumors, clinically and pathologically classified as goitre, may produce microbe cultures. It remains to be proved if these microbes are pathogenic. F. Lydston¹² reports the case of a young man, with incipient pulmonary phthisis, who developed an abscess of the right lobe of the thyroid. An examination of the pus for tubercle bacilli would have been interesting.

Froelich,¹⁸⁴ from a number of facts ascertained during three months' sojourn in a goitrous country, concludes that the following conditions accompany the production of goitre: (1) absence of hygienic care, material and intellectual poverty; (2) age—12 to 15 years; (3) presence in the water of notable quantities of lime and magnesia (not absolutely general); (4) altitude; (5) carrying large burdens causing bending of the head, and bending of the head during work; (6) acute phenomena which seem to indicate an infectious origin. In short, venous stasis is a predisposing and infection a determining cause (existing in the waters or air of certain countries). The infection may run an acute course. Two examples of this are mentioned.

Relation to Insanity.—Marzocchi and Antonini⁸⁸ have examined large numbers of goitrous cases in the asylum at Bergamo and deduced, among others, the following conclusions: Subjects of goitre become insane about nine times as frequently as normal individuals. The degenerative and puerperal forms of insanity predominate in goitrous cases. Goitrous patients, with curable forms of insanity, recover as frequently as do non-goitrous; nor is there any special difference in the duration of the disease. The thyroid gland, they conclude, has a direct action upon the central nervous system.

Treatment.—H. D. Stevens ¹⁹⁰ recommends chloride of ammonium, 8 to 10 grains (0.55 to 0.65 gramme) three times a day, continued, if necessary, through several weeks or months; also an ointment of the biniodide of mercury, of sufficient strength to raise the skin slightly, applied once a day until it takes effect. It should not be applied on a blistered or denuded surface. Du-guet ²¹² believes that solid, recent goitres, such as are met with in young subjects, and recent cystic goitres, are best adapted to treatment by injections of tincture of iodine, according to Terrillon's method (see ANNUAL for 1890). G. Naumann ³³⁶ advises giving up iodine injections on account of the danger connected with it, and on account of the periglandular adhesions which it causes. These adhesions afford especial difficulties in the event of a surgical operation becoming necessary. For narcosis this writer proposes at first chloroform, to be continued with ether; also the use of cocaine and morphine injections. Wölfler ³³⁶ also speaks of the dangers of parenchymatous injections. He reserves them for cases where a diminution of the goitre seems necessary, but where, for some reason, an operation is contra-indicated. In these cases he recommends iodoform after the Mosetig-Moorhof method, instead of tincture of iodine. In operating, before cutting through the capsule of the gland, one should assure himself of the nodular nature of the growth. Reverdin ⁸⁰ advises the administration of 3 grains (0.20 gramme) of iodoform a day, and claims, as a frequent result, marked improvement in from twenty to thirty days. When this treatment has proved unsatisfactory, surgical intervention may be indicated. Enucleation is to be preferred to extirpation where possible. R. Köhler ¹⁸ reports the disappearance of the enlarged left lobe after the removal of the right half, including the isthmus of a large parenchymatous goitre. Jul. Wolff ⁶⁰ says that shrinking of the portion of a goitre remaining after operation is a rule, without exception. J. Lehotzky ⁴¹ reports sixty-two enucleations of goitrous nodules. One great advantage of enucleation over extirpation is, that the recurrent nerve lies outside the field of operation. Poppert ⁶⁹ reports sixteen cases of enucleation of goitrous nodules after application of an elastic ligature to the base of the lobe (Bose's method). O. Bode ¹³ reports twenty-four cases of extirpation of the thyroid gland, one being malignant, with one death. F. Pick ¹⁸ reports a case of spindle-cell

sarcoma of the thyroid, in which were found foci of true bone-tissue. The following writers report one or more cases of tumor of the thyroid operated on: E. Willett²; Lannelongue¹⁸⁸; E. Lauwers⁵²; G. J. O'Reilly⁶; Porte¹²¹; Busachi²⁸; G. Balsamo⁵⁰; M. Christovitch⁶⁷; J. C. Warren⁹⁹; Battle²²; Vincent²¹¹; G. Kugler¹⁸; Symonds.²²

EXOPHTHALMIC GOITRE.

Etiology.—Möbius⁹⁰ concludes that the proximate cause of Graves's disease is probably abnormal action of the thyroid gland. This hypothesis is supported by the similarity and points of contrast between this disease and others depending on a deficient action of the thyroid (cachexia strumipriva, myxœdema, cretinism), by the fact that signs of Graves's disease may develop in cases of ordinary goitre, and that operative treatment of the goitre may influence the disease considerably. The cause of the primary thyroid affection is unknown. The conditions favoring the development of the disease are: female sex, neuropathic state, climatic conditions, all causes diminishing the resistance of the organism, and especially mental shock.

Pathology.—Mendel⁸⁶ reviews the latest published autopsies, eleven in all, of which six showed no lesion of the nervous system. Cheadle found changes in the olfactory bodies and dilatation of vessels in the cervical cord; Waekner, dilatation of vessels and obliteration of central canal; Drummond found the lower cervical ganglion adherent to its surroundings; Hopfengärtner, considerable shrinking of the right sympathetic and absence of the second cervical ganglion; White, haemorrhages into the medulla, extending into the restiform bodies. Mendel adds to these a case in which the sympathetic was normal. The only changes in the nervous system was a thinning of the left restiform body and an atrophy of the solitary bundle on the right side. The vagus, accessory, and glosso-pharyngeal nuclei were normal. Siemerling,⁶ however, reports a case in which both restiform bodies, the region of the glosso-pharyngeus, and the respiratory centre were intact. There were haemorrhages in the medulla, in the region of the vagus and hypoglossus, and also a degeneration in the sympathetic and the splanchnic nerves. Koppen also found the restiform bodies and the respiratory centre intact in a case which he examined.

Goldscheider, in another case, found the medulla, pons, and vagus intact.

Raymond and Sérieux⁸ consider exophthalmic goitre a general neurosis, having at times spinal, bulbar, and cerebral symptoms. It can precede, follow, alternate with, or accompany other manifestations of mental degeneration. The psychical troubles of exophthalmic goitre do not form an integral part of the affection. Their association with this affection is the result of the hereditary condition from which they both arise. Exophthalmic goitre is a pons-medulla neurosis, consisting in the exaggeration and permanence of the physiological phenomena of emotion. Renault⁵⁵ believes that this affection is not a definite morbid entity. Martin says that it stands in intimate relation with the neuroses, especially hysteria; and that it facilitates, in the predisposed, the production of insanity.

Symptoms.—L. F. Bryson⁴⁶² gives a review of thirty cases of exophthalmic goitre. Eight were men, twenty-two women. In the majority of cases the disease began after the age of twenty-five. Respiratory expansion (ANNUAL for 1891) was lessened in more than half of the cases. In eleven cases the respiratory expansion on forced inspiration was an inch or less. The breathing was increased in rapidity and altered in character.

Complications.—F. Chvostek⁸, has observed alimentary glycosuria in a number of cases of exophthalmic goitre, which shows the existence of certain disturbances in the carbohydrate metabolism. We should, therefore, he believes, trace back to disturbances of the functions of assimilative organs the true diabetes often noticed in exophthalmic goitre. Furthermore, it does not follow, from the simultaneous appearance of both processes, that the latter has a bulbar origin. Bourneville, corresponding editor, reports two cases of P. Sollier's, presenting the rare condition of the co-existence of a generalized œdema with exophthalmic goitre. One of the cases showed all the characteristics of a genuine myxoœdema. In both cases the thyroid, instead of being enlarged, was atrophied. The myxoœdema, as well as the exophthalmic goitre, improved under electrical treatment and hydrotherapy.

Treatment.—Joffroy¹⁷ recommends digitalis only in case the tachycardia is so exaggerated that there is a veritable asystole with pulmonary congestion, etc. Strophanthus is more easily

borne and calms the tachycardia. Bromide of potassium is useful. Milk treatment is often good in anæmic cases where iron is not well borne. Hydrotherapy is a useful resource against irritability and anæmia. Electricity, whether in the faradic or galvanic form, has proved of great value. Cardew ², uses a constant current of 2 to 3 milliampères in strength, the positive electrode (three inches in diameter) on the nape of the neck, the negative moved up and down on the sides of the neck in front of the sterno-mastoids for six minutes at a time, three times a day. L. F. Bryson ¹² has used, in cases with lessened chest capacity, systematized mechanical movements by means of Taylor's "Respirator." This machine produces, by means of various mechanical devices, a passive artificial respiration. Aside from the greatly increased chest expansion caused by its use, the author notes general improvement in the whole constitution, in muscular strength, circulation, tissue metabolism, mental and nervous power. The drugs that seemed to act most favorably were nux vomica, arsenic, and digitalis, the last used sparingly. The author considers that, under favorable conditions, the disease tends to recovery in from one to five years.

Stierlin ¹⁷ reports three new cases of the removal of the goitre in this affection. These, added to the cases published by Wölfler and some others, make a total of 29 such cases, of which 22 were cured, 2 improved, 3 not benefited, 1 died, and in 1 the result was unknown. F. Lemke ¹⁸, reports that the two cases previously operated on by him are in good health (see ANNUAL for 1892). Of three other cases since operated upon by him by the removal of half the gland the exophthalmia disappeared after the operation in two. The third had no exophthalmia, but palpitation, which had been violent before the operation, disappeared. The author thinks the condition is due to obstruction to the circulation caused by pressure of the struma on the veins of the neck. The remaining half of the gland moves downward and toward the middle. In no case was any deformity noticed afterward. If tracheotomy is necessary cricotomy is recommended, in which case the cannula must be long. This operation appears to have no injurious effect on the voice. Dreesman ¹⁹ reports three cases treated by Kocher and Trendelenburg by ligation of the thyroid vessels, resulting in cure. The improvement is slower after ligation of the vessels than after operative removal of the gland. E. Leflaive ²⁰,

says surgical intervention appears indicated in certain cases in which a lesion of a surgical order seems the cause of the affection. It is not generally to be resorted to before medical treatment has been well tried.

MYXÖDEMA AND CACHEXIA THYREOPRIVA.

Etiology.—J. Neudörfer ¹² says that during the period of sexual activity, chiefly, the thyroid has a direct trophic and regulating influence on the nourishment and development of the generative organs. During this period extirpation of the thyroid will cause disturbances of nutrition; in another period of life, when its function is extinct or has ceased, its extirpation will cause neither trophic disturbances nor myxoedema. Gley ³ describes two small glands found in rabbits, one on each side, half a centimetre below each lobe of the thyroid, lying on the carotid. Their structure is analogous to that of the thyroid in the embryonic state. If they are not extirpated cachexia does not follow. After removal of the thyroid these little glands develop and tend to take the character of the thyroid.

Hofmeister ⁵⁵ has removed the thyroid in rabbits five to six months old, without touching the glandules described by Gley. He found that in young animals, at least, the presence of these glandules does not completely compensate for the loss of the thyroid. Gley says that acute symptoms do not come on if these glandules are removed several months after removal of the thyroid.

R. Köhler ⁶⁹ reports a case of syphilis with myxoedema. Antisyphilitic treatment cured both affections; so that, apparently, a syphilitic disease of the thyroid was the cause of the myxoedema.

Pathology.—J. R. Whitwell ² gives the following results of the examination of the brain in a typical case of myxoedema with marked mental symptoms: Brain slightly oedematous; slight, diffuse, atrophic condition of the convolutions. Sections taken from a point one inch from the upper end of the ascending frontal convolution showed a marked abnormality in the nerve-cells, consisting of a tendency to distortion and diminution of the number of processes. The nuclei were inflated, distorted, and vacuolated. In some cases the cells had disappeared, leaving only the distorted nucleus. This condition might account for some of the mental, motor, and sensory phenomena of the disease. There was evi-

dently a disease of nutrition of the cells. F. Capobianco ⁵⁵⁹ finds, by a careful histological examination of the brain and spinal cord of thyroidectomized dogs, certain important lesions. They consist in circulatory disturbances and in special changes in the nervous elements, cell and fibre. The cellular degenerative forms are atrophy, granular degeneration, and vacuolization, with prevalence of one or the other form in different cases, and according to the region of the brain or spinal cord affected. These disturbances in the brain are more marked than in the rest of the nervous system. Atrophy prevails here. The cerebellum shows certain changes which are mentioned. Of the bulbar nuclei, the more constantly affected are the nuclei of the hypoglossus, facial, and vagus. The writer also states that thyroidectomy, when complete, is constantly fatal in dogs, the cause of death being referred probably to intoxication of the nervous centres by substances from whose evil influence the thyroid is intended to guard the organism.

Symptoms.—In a critical and historical review of the subject of cachexia thyreopriva, Horsley ² says that thyroidectomy does not cause cachexia in birds and rodents, but in all other animals symptoms are produced, most quickly in the carnivora, least so in the ruminants and solipeds, man and the monkey being between these extremes. The symptoms of the loss of the thyroid are to be classified as neurotic (tetanus, tremor, paralysis, anaesthesia), myxoedematous, and cretinic. They are not due to injury of the nerves of the neck in the operation, but to loss of the gland, which must be a secreting structure, influencing the metabolism of the blood and the nutrition of the tissues, especially those of the nervous system.

Treatment.—Von Eiseberg ^{8, 451} transplanted one-half the thyroid gland of a cat between the peritoneum and transversalis fascia of the same animal. One month later the other half of the gland was removed from the neck and the animal remained healthy. Two months later the transplanted gland, normal in appearance, was removed from its new situation. Typical tetanus developed on the next day and soon ended fatally. Similar experiments were tried on three other animals with the same result. J. Macpherson ²⁸ records a case of myxoedema in which the thyroid of a sheep was grafted into the infra-mammary region. Many of the symptoms entirely disappeared and the general condition was greatly

improved; the speech, however, remained slow. T. Harris and G. A. Wright ⁶ report temporary improvement in one case after transplanting one-half of the thyroid gland of a small monkey under each breast. Gley ⁸ has found that substances which diminish the excitability of the nervous system, bromide of potassium and antipyrin in particular, will diminish or suppress the convulsive symptoms following thyroidectomy. Canizzaro ^{99, 451} also discovered that, in dogs, he could overcome the symptoms of tetanus caused by total thyroidectomy by large doses of potassium bromide, and kept fifty such animals two years and two for six years after the operation. He has since been able to obtain the same results with hypodermatic injections of a concentrated solution of the substance of the thyroid gland. A solution of the gray matter of the brain of healthy dogs had the same effect. Vassale ⁹⁶⁶ has found that an extract of the thyroid gland, injected into the peritoneal cavity of dogs after thyroidectomy, acts similarly but less promptly and decidedly than when injected into the veins. Intra-venous injection of solutions of the brain, testicle, or blood serum had no such effects as the thyroid juice. His experiments favor the belief that the thyroid gland has the function of preventing auto-intoxication, by transforming the toxic products of tissue change into substances easily eliminated, or by directly neutralizing them by its own secretion. Gley, ²⁹⁰ after total extirpation of the thyroid in eleven dogs and the same number of rabbits, found the injection of the juice of the thyroid gland undoubtedly efficacious. Schwarz, ², however, cannot admit that the functions of the gland can be replaced by injections of thyroid juice. He used a watery extract of the gland, generally by intra-venous injection, in thyroidectomized dogs. The cases in which the usual symptoms of thyroidectomy did not follow were, he states, not more numerous than those occurring among untreated dogs. By far the greater number were absolutely unaffected by the injections.

The following writers report cases of myxœdema treated after G. R. Murray's method (ANNUAL for 1892), with improvement in every case: W. Beatty, ², Bouchard, ⁸, E. C. Carter, ², De Boeck, ²⁷⁶, M. Robin, ²², and Napier ²⁷⁸. Beatty supplemented the injections with massage. Bouchard calls attention to headache and pains in the limbs and thorax following the injection. No other writer mentions these symptoms. The improvement, he

thinks, will be only temporary. E. C. Carter used the thyroid of a pig instead of a sheep. His case was complicated with insanity. While there was marked improvement in the physical condition (becoming practically normal) after ten weeks' treatment, the intellectual powers remained in a degree impaired. His method of preparing the gland differs somewhat from Murray's and gives a more concentrated solution. The gland having been cleared of fat and fibrous tissue, a portion, as large as a damson, was cut up, put into a mortar with some glass (for example, a broken test-tube), about half a drachm (2 grammes) of glycerin, and a drop or two of a 5-per-cent. carbolic-acid solution, and the whole ground together to a fine paste. The latter was allowed to settle in a test-tube for twenty-four hours, leaving a clear, dark-red extract on top, which was decanted off and filtered through linen. The extract was made fresh every week, and a drachm (4 grammes) of it was given during that time in divided doses. In De Boeck's case the physical improvement after four months' treatment was remarkable, but the mental symptoms were very little, if any, changed. F. Eklund, corresponding editor, says that F. Howitz has obtained excellent results by the administration of the thyroid gland of calves internally as food.

LEGAL MEDICINE AND TOXICOLOGY.

By FRANK WINTHROP DRAPER, A.M., M.D.,
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THE MUTUAL RELATIONS OF PHYSICIANS AND PATIENTS.

Malpractice.—Chief-Judge Thayer, of the Oregon Supreme Court, in delivering the judgment of the court upon an appeal from a jury verdict in a case of imputed negligence and unskillfulness charged against a physician, made use of the following language (case of Langford *vs.* Jones).⁴⁵¹ It shows a progressive appreciation of a principle for which physicians and surgeons have long contended :—

“ The respondent’s counsel claim that there was sufficient evidence of the defendant’s negligence and unskillfulness in his treatment of the plaintiff to at least justify the trial court in submitting the matter to the jury. If that were so, said court had no other alternative. The practice, however, of leaving the jury to determine such cases has been permitted often when the responsibility was really upon the court. It is wrong and unjust to the medical profession to pursue such a course. It tends to encourage the institution of suits against its members when no grounds exist therefor. A physician, in the treatment of disease or in the performance of a surgical operation, does not always achieve that success he desired. Circumstances often intervene over which he has no control, and render his treatment unsatisfactory. This is more especially so with surgery. It frequently happens, in the reduction of a fracture or dislocation, that, for some cause for which the surgeon was in no wise responsible, the parts of the broken bone have not properly united, have been found not to be in perfect apposition, or the dislocated joint to be enlarged, or that muscular action of the limb has become suspended, or the limb become crooked; and sometimes, in consequence of important nerves having been severed at the time of the fracture, a loss of sensation of the parts is occasioned, resulting in a permanent numbness, and

amputation becomes necessary. In a majority of such cases the party injured by the casualty will claim damages against the surgeon who attended upon him, and have no difficulty in having an action instituted to enforce it, predicated his cause upon alleged negligence in the reduction of the fracture or dislocation, or of insufficient support to the broken parts, or of too tight bandaging, or upon some other pretext, but relying mainly upon the deformity of the limb as the ground for a recovery; and generally, through the sympathy, prejudice, or stupidity of a jury, succeed in mulcting the defendant in damages. I have listened to the trial of several such cases, participating in some of them as attorney, and I have never yet heard an argument in favor of a recovery that did not consist almost entirely in commiserating the unfortunate plaintiff, and in lampooning and ridiculing the more unfortunate surgeon. The average juror knows very little about such matters. If he has sufficient discretion to understand them in the outset, he will lose it by the time he has heard the expert testimony and the summing up of the counsel. A trial court should never allow a case of malpractice to be submitted to a jury, unless the plaintiff has fairly shown by competent proof that the defendant is guilty of the charge alleged against him. I am satisfied that actions of that kind against physicians, especially surgeons, are liable to incite injustice, and are detrimental to the interests of the community. Persons who devote their lives to the study of physiology and anatomy, with a view to relieve the misfortunes and sufferings of mankind, deserve encouragement. The practice of bringing that character of actions against surgeons of acknowledged skill and ability, and subjecting them to the payment of large sums of money, has had a strong tendency to induce them to hesitate about setting broken bones or performing other operations essential to the alleviation of human misery, and, if not checked, is liable to drive them out of the profession and leave the performance of its duties to irresponsible quacks and empirics."

The Legal Duty of a Patient to Obey his Physician's Instructions.—An able article by Bulette, of Philadelphia,⁴⁵¹ lays down the following principles:—

"The relation of physician and patient is one of mutual obligation. The law imposes certain duties upon the patient as well as upon the physician; and he who fails in obedience to the

requirements of the legal duties thus imposed must himself suffer the consequences for any injury directly caused by such failure.

“ While the law requires that the physician bring to his employment reasonable and competent medical knowledge and skill, and that he exercise the same at every stage of the treatment, it, at the same time, requires that the patient exercise, in the first place, ordinary care and prudence in the selection of a physician or surgeon, and then obey the reasonable instructions and directions of the latter.

“ This rule does not require of the patient mere passive acquiescence in the treatment of his medical adviser; but it does require that he, at all times, actively co-operate with his physician in such a way as to further the object of the treatment to which his body is being subjected. Having used reasonable prudence in the selection of a physician, the patient must submit to such treatment as the physician prescribes. But, if he will not, or under pain cannot, his failure so to do is his own misfortune, for which he cannot hold the physician responsible; since one may not take advantage of his own wrong, or charge his misfortune to the account of another. An insane patient is not responsible for disobedience to his physician’s instructions. The condition of such a patient calls for the exercise of a higher degree of care and attention on the part of the physician.

“ Parents are likewise bound by the same duty of obedience to the treatment and instructions of the medical attendant of their infant children. Where the parents of the patient, a boy 8 years of age, were also in charge of him and nursed him, but failed to obey the directions of the physician in respect to his treatment and care, thereby contributing to his injuries, the patient could not recover damages therefor.

“ The rule in respect of the degree of obedience to the treatment and directions of the medical attendant should, however, be stated with this qualification: that it must be such as a physician or surgeon of ordinary skill would adopt or sanction. For if the treatment be painful, injurious, and unskillful, the patient is not bound to imperil his health and perhaps his life by submission to it. . . .

“ It is necessary, therefore, before the practitioner can shift the responsibility from himself to the patient, on the ground that

the latter did not submit to the course recommended, that he show that the prescriptions were proper and adapted to secure a favorable result. The practitioner must satisfy the jury on this point, and in order to do so he may call to his aid the science and experience of his professional brethren. But he may not cover his own want of skill by raising a mist out of the refractory disposition of his patient."

DEATH BY DROWNING.

The Causes of Death in Cases of Drowning.—Brouardel, of Paris,³ sets forth three ways in which death by submersion is brought about. In the first, the individual dies at the moment when he falls into the water, succumbing to the effect of shock and of cold upon certain branches of the trigeminal or superior laryngeal nerves. It is an act of violence to be designated as inhibitory, which suspends respiration and the heart's action. No water enters the air-passages and resuscitation is quite possible. This inhibitory effect has long been recognized, and it has been known that active stimulation of the superior laryngeal nerve, or of the larynx itself, or of certain other parts of the body can cause sudden death.

In another variety of death by submersion, the person sinks at once to the bottom and is held there. During the first minute water does not enter the trachea, but is prevented by spasmotic action of the muscles used in respiration. Presently this spasm ceases and the water enters. Even under these circumstances, if the individual is rescued quickly, resuscitation by the ordinary methods is practicable.

There is a third class of cases which is more numerous than the others. The person sinks at first to the bottom, then rises to the surface, struggles, suffers contractions of the diaphragm which force the regurgitation of substances out of the stomach, into the pharynx, whence they pass into the air-passages in the attempts to breathe. In addition, there enters into the circulation an amount of water which equals a quarter or a third of the total amount of the blood. The blood-globules are correspondingly diminished. In these subjects, the alveoli and bronchi are filled with mucus and froth and the pavement epithelium undergoes a degenerative change in consequence of the passage of the water through it. Under such conditions resuscitation is impossible.

A New Method of Resuscitation.—Laborde, of Paris,¹⁰⁰, has

described a new method of procedure which he deems useful in resuscitating persons apparently dead by drowning. It consists in drawing the tongue well out of the mouth and imparting to it energetic and rhythmic backward and forward movements. This manœuvre has the effect of stimulating the respiratory reflex through traction on the tongue, acting especially on its posterior and inferior parts. The idea of applying this method to the human subject was suggested to Laborde by his success with it in his laboratory. In cases of suspended animation in animals under experiment,—whether due to syncope, accidental asphyxia, or to chloroform or chloral,—Laborde has long been in the habit of supplementing electrization (the passage of interrupted currents from the mouth to the anus) and ordinary artificial respiration with this method of rhythmic tongue-traction, which of itself was often sufficient to determine respiratory movements after a series of loud hiccoughs, which, at first passive,—*i.e.*, provoked by the manœuvre only,—soon became spontaneous. Laborde cites the case of two individuals whose lives he saved by his method. The *modus operandi* is very simple. A spoon, the handle of a knife, or any such instrument, is utilized for the double purpose of keeping the jaws apart and pressing on the base of the tongue. The tongue is then seized between the finger and thumb—which, to avoid slipping, are enveloped in a handkerchief—and pulled forcibly forward out of the mouth. The organ is then subjected to the rhythmic to-and-fro movements, eighteen to the minute, until success crowns the operator's efforts. Whilst advising recourse to the methods usually employed, Laborde believes that his own proceeding is the most effectual, and that it will often succeed even when all hope is apparently fled.

SUDDEN DEATH.

From Affections of the Nervous System.—Knapp, of Boston,⁹⁹ in discussing this subject, limits the descriptive term "sudden" to those cases of death occurring within an hour after the onset of the symptoms. Vagus neuritis is the only lesion of the peripheral nerves which is common as a cause of sudden death. It follows acute infectious diseases (diphtheria, for example), and explains the sudden termination sometimes observed through paralysis of the heart. Spinal haemorrhages and inflammations do

not occasion sudden death unless the lesion is high enough to involve the medulla. Of the cerebral affections, haemorrhage is the chief source of the danger under consideration ; and its highest degree of suddenness is found in haemorrhages involving the medulla, pons, and cerebellum. It is less grave when it is meningeal. Cerebral softening and inflammation, abscess, tumors, and sclerosis do not terminate suddenly. An occasional fatal result, supervening without warning, marks an epileptic seizure, as well as other convulsions due to gross cerebral lesions. So, too, shock is sometimes fatal. Knapp estimates that probably not one death in a hundred is to be classed as sudden, and only about one-tenth of these are attributable to affections of the nervous system.

From Abdominal and Pelvic Emergencies.—These casualties have been considered by Irish, of Lowell, in an article contributed to the Massachusetts Medico-Legal Society.²⁰ Among the abdominal conditions that cause sudden death, the author mentions ambulatory cases of typhoid fever eventuating in perforation. He estimates that cases of perforation of the intestine constitute about 5 per cent. of all typhoid attacks, and states that these are most common in persons who present a mild form of the disease. Ectopic pregnancy is described as the principal pelvic danger leading to a sudden termination, rupture of the Fallopian tube and rapidly fatal haemorrhage causing the characteristic and alarming clinical phenomena.

Another contribution to our knowledge on this subject is made by Bonvalot,²¹² who studied the matter both pathologically and medico-legally. The observations which he has gathered are very instructive. Some of these relate to sudden deaths following an intra-uterine injection after parturition. Thus, a patient of Bruntzel, four hours after her delivery, having already received, without harm, one intra-uterine injection, passed into a fatal syncope, when about a litre (1 quart) of the fluid of a second injection had been introduced. A similar accident occurred to Cory with an injection of perchloride of iron ; and to Rogers with one of tincture of iodine. In each of these cases the autopsy resulted negatively, revealing nothing abnormal. But sudden death does not follow intra-uterine injections only ; it has been observed in the course of the labor, with nothing save syncope to explain it. Brouardel is quoted as having witnessed such a case, the patient

dying, without warning, during a vaginal examination, just after her admission to the maternity. The most careful autopsy failed to discover any lesion adequate to explain the death. Brouardel cited, in connection with this case, an instance in which a young girl suddenly succumbed, while an injection with a glass syringe was being administered in the treatment of a vaginitis after an attempt at rape. Vibert has recorded a case in which death occurred on the introduction of an instrument for procuring an abortion; a cannula had been passed within the uterine cavity without the injection of water, and, without any other cause intervening, fatal syncope resulted. In explaining these unheralded accidents, Bonvalot recalls Brown-Séquard's observations on the inhibitory effects of blows on certain parts of the body, such as the larynx and abdomen. The uterus appears, according to this writer, to possess a similar inhibitory sensibility, and it is through this capacity, favored by other conditions and incidents, such as antecedent haemorrhages, pains, emotions due to fear, particularly in attempts to induce abortion, for example, that sudden deaths are best explained with reference to uterine stimuli. The medical jurist, therefore, in such cases, wherein the autopsy results negatively and fails to explain the deaths by manifest lesions, may interpret the fatal result on the theory of inhibition, and may thus relieve the accoucheur from all imputation of neglect or unskillfulness, provided the usual precautions have been taken in the care of the case.

Sudden Death in its Relations to an Inherited Neuropathic Degeneration.—Cullere,⁸⁸¹ Jan., Feb., Mar. 1888 ¹⁰⁰ has published a work designed to demonstrate that, in some instances, sudden death is an evidence of inherited nervous defect, and that it is frequently observed in families in which this neuropathic condition is pronounced. He gives eighteen instances in which the individual, without any recognized disease, died suddenly and inexplicably. In all these cases there was, either in the children or the parents of the decedents, some form of mental or nervous disease, whose frequent recurrence indicated a family defect. The author classifies these cases of sudden death under three groups: (1) such as are found in families showing a tendency to inherited mental disease (vesania); (2) such as occur in families where general paralysis is a coincident affection; (3) such as are observed in families where convulsive disorders of the nature of epilepsy have prevailed.

Sudden Death from Pulmonary Embolism having its Origin in a Thrombosis of the Inferior Vena Cava and Sarcoma of the Testis.—Rolleston, Pathologist to St. George's Hospital, London, records the following striking case⁶ :—

"A. D., a well-nourished man aged 22 years, was brought in dead into St. George's Hospital. The following history was obtained from his companion: He had been lying down on the grass in a park; on getting up and walking a few yards he fell to the ground with a cry of pain, pressing his hands to the front of his chest; he became 'black as jet' in the face, and died very speedily. At the post-mortem examination there was a congenital inguinal hernial sac on the right side which contained omentum, but which had evidently contained some coils of adherent small intestine at some former time. The right testis was enlarged to about three times its normal size, was knobby on the outside, and on section was seen to be occupied by a haemorrhagic new growth, which, microscopically, was a sarcoma; the tunica vaginalis was not adherent. The glands around the inferior vena cava were greatly enlarged, from the presence of new growth like that in the testis. These glands infiltrated the wall of the inferior vena cava below the entrance of the right renal vein, and produced an adherent clot, which narrowed but did not occlude the lumen of the vessel. Lungs: left somewhat œdematosus; no clot in the left pulmonary artery or its branches; right normal; the right pulmonary artery contained a firmly fixed but not adherent clot, which, on section, resembled that in the superior vena cava. Brain, heart, and other organs healthy."

ON FALLS FROM HIGH PLACES.

Bonnette²¹² has made a special study of the lesions caused by the throwing or falling of the human body from any elevated location. Accidental falls furnish numerous examples of this sort of injury, suicides being relatively infrequent from this cause. The medical jurist must decide whether the person found dead came to his death as a result of a suicide, an accident, or a crime; whether the fall was actually the cause of the death, and whether or not the individual was alive when he struck.

Criminal violence, by blows with the foot or with a club, for example, are frequently fatal. The death, in these cases, is due

to a local contusion, without general complications. The results of a fall from a height differ in this, that visceral lesions are both extensive and numerous. If, moreover, one finds, in a contused wound, sand or other similar foreign matter, the chances are many that the death was from the fall.

The visceral lesions, multiple in character, are especially the characteristic result of falls from a height; but the author points out one injury which he deems peculiar to this form of fatality. Observations show that when a person has fallen a distance of five or ten metres, striking either on the head or the feet, there is found, on opening the skull, extensive rupture of the cerebral mass; but the most frequent and the best-defined lesion is the injury found on a level with the lesser sphenoid wings; here the apophyses of Ingrassias penetrate like cutting instruments into the brain-tissue.

The question whether the person met his death by unlawful violence is often very difficult to determine. If one finds upon the neck of the cadaver the crescentic imprints representing the pressure of finger-nails, or sees the traces of a circular groove, one can determine, almost at a glance, that the victim of the violence has first been choked or strangled and then cast from a height. Beyond such evidence, there is simply opportunity for conjecture, based upon the victim's antecedents, his mental condition, his occupation, and so on.

The problem whether the person found dead was dead before he struck the ground in falling is one which only certain favoring conditions would enable one to solve. Theoretically considered, wounds made before death are unlike those made after death, and, in certain cases, this difference is manifest. But it is very difficult to determine how long a time must elapse after the death of a person before a wound upon his dead body would present appearances clearly in contrast with those made in tissues still living. This interval varies, conditionally, from a few minutes to two or three hours or more. Consequently, if a person who has received a mortal blow is at once thrown from a height, the fall would result in contusions not to be distinguished from those made upon the living body.

PROOFS OF PERSONAL IDENTITY.

By Means of Finger-Tip Markings.—Following the lead of Galton in his researches upon the papillary lines at the finger-tips,

as evidence of identity, Forgeot²⁰⁸, has made some new observations having a practical bearing in legal medicine. The principle of these observations consists in developing and bringing into view the latest traces left upon various objects by the hand which has been casually or purposely placed thereon. The author recalls the fact that normal perspiration contains a considerable number of component principles,—fatty matters, salts, and the like, some of them in relatively large amounts. If, now, a hand moist with sweat touches a paper surface or a drinking-glass, the following phenomenon results: the aqueous and volatile parts quickly disappear in evaporation, but the solid matters and fixed components remain at the point of contact. Now, the orifices of the sweat-glands are situated upon the ridges of the papillæ, and the traces left by the moist hand will reproduce exactly the very outlines of these papillæ. It remains now to find a simple process for bringing these imprints into view. Forgeot recommends for this purpose ordinary ink applied in a thin layer over the surface which has received the pressure of the fingers; this brings the imprint out with greater or less clearness, according to the more or less moist condition of the hand used in the observation. The season of the year has some control over the success of the method, warm weather being more favorable than cold. Individual peculiarities, also, are to be taken into the account. The hands of criminals are well adapted for the method of observation described, because a certain degree of moisture of the palm usually follows the commission of crime, on account of reflex influences.

For revealing the imprint of the naked foot upon a wooden surface, the author advises the use of an 8-per-cent. solution of nitrate of silver as an application to the suspected track; this is to be followed by exposure to sunlight. The marks of finger-tips on glass surfaces are particularly easy to expose, and it is possible by the use of hydrofluoric acid to make the imprint indelible.

Believing that the markings left by a single finger-tip (daktyograph) suffice to establish identity absolutely, the author considers it desirable to add this method to the anthropometric data now in vogue in France. It would be practicable thus to establish, in all the penal colonies, a methodical catalogue of data for the identification of prisoners, and this catalogue would be of permanent use and applicability.

By Means of Clothing Measurements.—A brother of Bertillon, whose name is honorably associated with a well-known system of anthropometric proof now widely accepted, has published⁴⁶, an ingenious series of observations designed to supplement the older method of mensuration data relating to various parts of the human body. The author discusses his problem under two aspects: (1) given certain parts of the clothing of an individual, to determine the dimensions of the principal long bones entering into the anthropometric description; (2) the anthropometric description of an individual being given, to determine the size of various parts of his clothing. Under the first set of data, Bertillon has studied the shoe under various conditions of fit and wear. Another series of observations relate to the hat, with reference to the size and shape of the wearer's head. Still other studies have for their object the determination of the height and girth of a man from the trousers which he has worn. Finally, the coat is made use of for a similar purpose. This work of Bertillon is a contribution of value to the general subject of personal identity.

RIGOR MORTIS AFTER DEATH BY POISON

Paltauf,⁴⁷ has reported some experiments to establish the relation between cadaveric rigidity and certain poisons taken in fatal doses. For the purpose of these experiments, such poisons were used as were known to exert a certain influence on the muscular system, either by directly acting on the muscular substance or indirectly by affecting the nervous system. Amongst the poisons belonging to the first series curare always considerably delays the occurrence of rigor mortis. Amongst those acting on the central nervous system, strychnine, picrotoxin, camphor, and the salts of ammonium accelerate the occurrence of rigor mortis. This acceleration is still more increased by artificially prolonging the stimulation of the muscular system, but is again arrested on the occurrence of paralysis. Veratrine and physostigmine cause only a slight acceleration of the rigor mortis, but with caffeine and its chemical derivatives—the rhodan salts—this acceleration becomes considerable. To study the influence of the nervous system at the time of occurrence of the rigor mortis, Paltauf divided the nerves and the spinal cord, with the result that, the more a muscle had been stimulated by the poison, the sooner was the rigor mortis observed,

independently of its connection with the spine, if such connection existed. The reaction of the rigid muscles was, in the case of many poisons, as has been generally believed, acid. Other poisons, however (such as camphor, ethyl-theobromine and the rhodan salts), gave, contrary to the general assumption, an alkaline reaction. This alkaline reaction affected, however, only the anterior portion of an animal in which, after the poisoning, the cord had been divided. The posterior part of the animal, in which the rigor mortis was delayed, showed the usual acid reaction until the alkaline reaction of putrescence took place. Where the reaction of the anterior portion of the animal was alkaline it often became, after the reduction of the rigidity had passed off, neutral or slightly acid before putrescence once more made it alkaline. Division of a single nerve had the same result, and it was possible to cause either alkaline or acid reaction in the various muscles of one extremity by leaving the nerve entire or dividing it. Paltauf also approached the solution of the question of the existence of a cataleptic rigor mortis. He found that the convulsive muscular contractions of an animal poisoned by camphor and suddenly killed by strangling led to immediate rigor mortis, and he therefore believes in a cataleptic rigor mortis.

TOXICOLOGY.

Aconite.—I. Case reported by Assistant Surgeon Robinson, U. S. Army.⁹⁹ A soldier recovering from a debauch took 2 fluidrachms (8 grammes) of tincture of aconite. When seen, an hour later, he presented the following symptoms: Great restlessness and nervous excitement; numbness and cramps in the arms and hands; carotid pulse 119, radial pulse imperceptible; respirations 19, normal at first, afterward shallow; pupils dilated and responsive; extremities cold; nose pinched; face wet with cold sweat; occasional relapses into insensibility. Treatment: Apomorphia hypodermatically; lavage of stomach; subcutaneous injections of digitalis, ammonia, and brandy. Result, recovery from all toxic symptoms on the following day.

II. Case reported by G. H. Tuttle, of Cambridge, Mass.¹⁰⁰ A man of intemperate habits swallowed within 10 drops of a fluidounce (30 grammes) of tincture of aconite after immoderate use of alcohol. Twenty minutes later he complained of obscure

illness, but no attention was paid to him; presently, vomiting, pulselessness, extreme prostration, slow respiration (hardly audible), great muscular relaxation, cold extremities, complete coma, irresponsive pupils were the observed symptoms; there were no convulsions. Treatment: Brandy and digitalis subcutaneously; digitalis, nux vomica, and brandy by the rectum; external stimulation by means of heat. Result, recovery. After four hours of energetic treatment consciousness was restored and the mind was clear. As the patient recovered, he complained of great numbness, a feeling of tension in the head, thirst, and a burning pain in the stomach.

III. Reported by Vibert ⁸_{Mar. 10}. Six persons took, each, a small wineglassful of tincture of aconite, supposing it to be tincture of cinchona. Three of the patients died. The symptoms observed were the same in all the cases, namely: in from a quarter of an hour to half an hour after the dose, a general feeling of sickness, numbness and prickling, tingling in the mouth, numbness of the tongue and lips, vomiting and at length a feeling of great coldness, with a tendency to fainting. There were no convulsions, troubles with the vision, or complete loss of consciousness.

IV. Reported by Garand, Physician to Hôtel-Dieu, Paris. A woman, suffering from neuralgia, took 3 teaspoonfuls of a solution containing 15 milligrammes ($\frac{1}{4}$ grain) of nitrate of aconitine in 120 grammes (4 ounces) of distilled water. The doses were taken at intervals of half an hour. The symptoms which followed were: restlessness, burning pain in the stomach, cramps, numbness and prickling, feeble respiration, vomiting, salivation, extreme exhaustion, convulsions, and complete unconsciousness; death, three and a half hours after the first dose. Anatomical appearances: Marked cadaveric rigidity; extreme congestion of the lungs; fluidity of the blood; hyperæmia of the gastric mucous membrane, extending to some degree to the intestines; congestion of the peritoneum, the liver, spleen, and kidneys; marked injection of the vessels of the meninges.

Ammonia.—Reported by J. M. Da Costa, ⁹⁹_{Dec. 24, 1911} of Philadelphia. A man, 46 years old, swallowed by mistake a quantity of strong solution of ammonia, the amount passing the pharynx being small,—a single swallow. These symptoms followed: stertorous respirations, 28 per minute; husky voice, due to œdema of the

glottis; swelling of the lips, gums, tongue, uvula, and tonsils; headache and delirium; cough with blood-streaked sputa; enlargement of lymphatic glands in the neck; urine diminished in amount, turbid, high-colored, specific gravity 1024, alkaline, albuminous to a marked degree, showing under the microscope blood-discs and numerous epithelial, hyaline, and slightly granular casts. He was fully convalescent in four days, all his more serious symptoms having subsided.

Antifebrin.—During the last influenza epidemic in Sweden, a great many cases of poisoning by antifebrin were observed, as people, immediately they were attacked or believed themselves to be attacked, applied to chemists for the purchase of the drug and took it *ad libitum*. All these cases, however, even when somewhat severe symptoms followed any considerable abuse of the remedy, ended in recovery. W. Warfvinge, of Stockholm, has published two such cases.⁶ The first was that of a man aged 35 years, who took 2 drachms (8 grammes) of antifebrin one morning. In five minutes he felt fatigued and experienced a sense of weight in his head, and soon afterward black and red clouds appeared before his eyes. Then lassitude in the extremities came on and he went to bed and slept for an hour and a quarter, when he was easily aroused by a call. All this time he understood everything, though not very clearly; but when he attempted to rise he felt giddy, staggered for a few steps, and then fell down unconscious. When brought to bed again he swore and fought like one drunk, but soon sank into a comatose condition, with closed eyes; well-marked cyanosis, especially of his lips; relaxed muscles, cold hands and feet, decreased temperature, moderate diaphoresis, and a lowering of respiration and pulse. These latter improved after hypodermatic injections of camphor and ether, but the comatose state continued for sixteen hours. The following day no symptoms remained but frontal headache and cyanosis. The temperature varied from 97.7° to 101.12° F. (36.5° to 38.4° C.). The urine was clear, deep-colored, and contained much indican, but no blood, albumen, or sugar. Some cyanosis could still be observed on the third day, when the urine was violet from traces of indican. The second case, which, like the first, had been treated in the Sabbatsberg Hospital, was that of a girl of 15, who had taken nearly half an ounce (15 grammes) of antifebrin with only just enough water

to enable her to swallow it. In a quarter of an hour her whole body became hot and perspiring. Immediately afterward she complained of vertigo and impairment of sight, and on attempting to rise from her chair she fell to the ground fainting, and remained in an unconscious state for seven and a half hours. After admission to the hospital vomiting came on. Coma was not so deep as in the other case, and she answered when spoken to loudly. Cyanosis was well marked, but disappeared the following day. The pupils were slightly contracted. The temperature varied from 96.8° F. (36° C.) to normal. The much speedier complete recovery in this case is probably explained by the washing out of the stomach, which was done within an hour after the antifebrin had been swallowed. Some cases recorded by other authors are referred to by Warfvinge. A patient of Z. W. Piehl had taken 2 scruples (2.60 grammes) of antifebrin on two consecutive days as a remedy against the "Russian influenza," and the second dose was almost immediately followed by restlessness, dyspnoea, vertigo, vomiting, lassitude, pallor of face with cyanosis of lips and nails, a small pulse of 120, and extremely cold hands, feet, and nose. Consciousness was, however, not lost in this case, and stimulants soon led to recovery. Albert Pallin observed in two workmen, each of whom had taken 2 tea-spoonfuls of antifebrin in a day, cold sweats, cyanosis, fright, depression, and incipient collapse.

Arsenic.—Reported by W. Harding, of Berry Wood, England. A good example of chronic poisoning by arsenic occurred at a county insane asylum near Northampton, England, under the reporter's observation.⁶ For a long period, the nurses at the asylum were in poor health. First one and then another gave up until, within a few months, nearly every nurse on the staff had been, or was, under medical treatment. Headache, neuralgias, gastric derangements, loss of appetite, constipation or diarrhoea, irritation of eyelids, anaemia, were the chief symptoms complained of. Drugs did not appear of much avail, but a holiday had a marked effect for good. At last one nurse had the eye symptoms in a more pronounced form, and suspicion was aroused. In each nurse's room was a green-baize curtain, used as a covering for dresses, etc. A portion was taken and examined. It was found to be impregnated with arsenic to an astonishing extent. These curtains were removed; the rooms were freely ventilated; medical treat-

ment was stopped; the symptoms disappeared, and, though some months elapsed, did not return. The baize was similar to that used for covering doors, etc., and was obtained from two manufacturers.

Cannabis Indica.—Observation reported by Weil,²¹ of Lyons. A druggist's clerk took, in the space of an hour, 1 grammme (15 grains) of hasheesh. He dined immediately after, with a good appetite, but an hour later began to feel the effects of the drug. His eyes seemed drawn out of their sockets; he tried to vomit; he was unable to change his posture; his eyes turned invariably toward the left. There was slight delirium. There was no sensation of exhilaration, or of pleasant emotional effects, such as have been described by hasheesh-smokers.

Cantharides.—Carl Beck, of Chicago,⁷⁹ reports the following case: A woman, three months pregnant, took a teaspoonful of powdered cantharides for the purpose of inducing a miscarriage; the amount, by weight, of the poison was estimated as 42 grains (2.69 grammes). Great abdominal pains followed, with persistent vomiting, the vomitus consisting of food mingled with mucus and blood. Soon strangury developed, the patient having repeated desires to micturate, the intervals being short and the result only a few drops of urine. Other symptoms were: dilated pupils, cyanotic lips, inflamed tongue, dysphagia, cardiac depression (pulse 60), gastric tenderness, and pain over the right kidney. The urine became cloudy and reddish and contained blood. Upon chemical examination of the urine, a residue was obtained which caused vesication. The patient, ten hours after taking the poison, sank into extreme collapse, from which she was relieved with difficulty. But after this there was gradual improvement, and on the fifth day the symptoms had subsided, leaving only an appreciable weakness with cardiac palpitation. Two other incidents belong in the history of the case: the abortion was accomplished, and an increased sexual appetite, amounting almost to nymphomania, was observed.

Cocaine.—I. Reported by Rudolf Trzebicki.^{84, 26} The injection of 0.05 grammme ($\frac{1}{4}$ grain) of cocaine, in a case of herniotomy in a child $2\frac{1}{2}$ years of age, was followed, half an hour after the completion of the operation (which was otherwise successful), by coma, collapse, muscular spasms, and Cheyne-Stokes respiration. These symptoms lasted eight and a half hours. On the following days there were similar, but shorter, attacks. The child recovered. On

the day of operation there was complete anuria. The urine, which was subsequently voided, was normal.

II. Reported by Berger, of Paris.¹⁰⁰ For the purpose of controlling the pain of an injection of tincture of iodine into the sac of a hydrocele, a tablespoonful of a 2-per-cent. solution of cocaine was injected into the adjacent tunica vaginalis before the iodine was used, was left there a minute and then withdrawn, and the iodine was then thrown in. The patient did not feel any pain from the operation. Presently, very great pain developed. Convulsive motions of the face and limbs were observed; there were tonic and clonic spasms, tetanic rigidity of the muscles, and finally complete coma. The pulse was 130. All means undertaken to restore the patient— injections of ether and caffeine, artificial respiration, tracheotomy, insufflation of oxygen—proved fruitless, and the man soon died. Anatomical appearances: Congestion of the meninges and of the lungs, mitral insufficiency, and some of the lesions of alcoholism. The tunica vaginalis was perfectly free from the appearances of inflammation.

Exalgin.—I. Reported by A. Lockhart Gillespie, of Edinburgh.³⁶ A man of 23 years, suffering from severe toothache, had taken 36 grains (2.30 grammes) of exalgin between 2 and 11 P.M. Shortly after 11 he relapsed into unconsciousness. When seen, his temperature was found to be normal; his pulse 79, regular, of fair tension; but all his muscles paretic. With severe pain in his head, convulsions occurred every few minutes, and on tapping the scalp or pricking the arm or leg with a pin, fresh spasms were initiated. All his reflexes were abolished, and his pupils, widely dilated, reacted sluggishly. As time went on the breathing became of a distinctly cerebral type, the pulse now and then intermitting during a paroxysm. About half an hour after he was first seen $\frac{1}{4}$ grain (0.016 gramme) of morphia was injected, and he swallowed, though with difficulty, two pills, the only purgative handy. Cloths, soaked in cold water, were applied to his head. As the pupils contracted under the influence of the morphia the fits became less severe, but the effect of the drug did not commence until ninety minutes after injection. All the following day the patient, who remembered nothing of the previous night, was unable to use his muscles, while his arms and legs were absolutely anæsthetic. His bowels had moved freely. He had a slight

return of the symptoms next night, but 15 minims (1.00 grammie) of laudanum, repeated every four hours, soothed his irritated medulla, and in the course of the following day he became considerably better.

II. Reported by G. V. Gilray, of Melbourne, Australia.² A woman took by mistake 17½ grains (1.15 grammes) of exalgin to relieve the pain of toothache, the prescribing physician having confused the doses of exalgin and sulphonal. Convulsions; unconsciousness; free perspiration; weak, rapid, and intermittent pulse; dilated pupils, and shallow breathing were the effects observed. After free vomiting (due to apomorphia) and active stimulation the patient quickly recovered.

Fish (Salmon) Poison.—Arnstamoff¹⁴⁷ reports observations on eleven cases of poisoning in human subjects after eating salted salmon; five of the patients died. An examination of the fish showed a peculiar soft consistency, but no putrefaction. Under the microscope a large number of living micro-organisms were seen, which bore considerable resemblance to the typhoid bacillus. Symptoms of poisoning developed in the patients in ten to twenty-eight hours after ingestion of the fish; the amount ingested had no influence on the rapidity and intensity of the toxic symptoms. The chief manifestations consisted of general weakness, abdominal pains, dyspnœa, mydriasis, diplopia, vertigo, dryness in the mouth, dysphagia, aphonia, obstipation, anuria, and reduction of temperature. The pathologico-anatomical examination showed nothing specific other than death from asphyxia. The microscopical and bacteriological examination of the organs demonstrated the presence of microbes similar to those found in the fish. Pure cultures made with these microbes were injected into nineteen rabbits, two dogs, and two cats. All the rabbits died, and the dogs and cats recovered, but only after severe illness. The animals showed symptoms similar to those observed in the human being, and in the viscera of those examined post-mortem the same specific micro-organisms were found.

Hyoscine.—I. Reported by Emil Korn, of Tapian.^{116, 166} The dose taken, probably with suicidal intent, was 1 centigramme ($\frac{1}{2}$ grain) of hydriodide of hyoscine (the doses usually exhibited vary between 0.0002 grammie and 0.003 grammie— $\frac{1}{200}$ to $\frac{1}{10}$ grain). The patient, besides suffering from thoracic disease, was melan-

cholic and the subject of delusions of persecution. The effects of the dose were: stupor, with stertorous breathing, flushed face, and dilated pupils. The action of the heart was not influenced. About $\frac{1}{16}$ grain (0.004 grammie) of apomorphia was exhibited subcutaneously, but without effect (on account of heart disease it was feared to give more); an ice-bag was applied to the head, sinapisms to the calves of the legs, and black coffee administered by the mouth in teaspoonful doses. On awaking three hours after there were headache and dryness of the mouth. The next morning the patient was sufficiently recovered to leave his bed.

II. Reported by Herbert L. Evans, of Goring-on-Thames, England.⁶ A man suffering from delirium tremens, having failed to obtain relief from chloral, bromides, and morphia, received a hypodermatic injection of 2 minims (0.13 grammie) of a 1-per-cent. solution of hyoscine; eight hours later, the effects of the first dose having been negative, he received nearly 3 minims (0.20 grammie) of the hyoscine solution by the mouth, with no better result. Later on, as he could not be kept in bed and was quite unmanageable, a 3-minim (0.20 grammie) injection of hyoscine of presumably the same strength, but from a different bottle, was given. The patient rapidly became comatose, with dilated pupils and arteries; rapid pulse; congested face; hot, dry skin, and rapid and deep breathing. Morphia was injected, but without any apparent improvement. Pilocarpine nitrate was injected subcutaneously, to the amount of about 2 grains (0.13 grammie); rapid improvement and complete recovery followed.

Magnesium Sulphate.—Case reported by Sang, of Dundee, Scotland.⁶ A woman, about 35 years old, took at a single dose 4 ounces (124 grammes) of Epsom salts, dissolved in hot water. An hour later she had burning pains in the stomach and bowels; difficult respiration, attended by a choking feeling; and a peculiar weakness in the arms and legs. There was no vomiting or purging. Presently extreme collapse occurred; the pupils were dilated; there was slight twitching of the facial muscles; paralysis of the limbs was observed. The patient quickly became comatose and death followed in an hour and fifteen minutes after the dose was swallowed. There was no autopsy.

Mercuric Bichloride.—Reported by G. Durante, of Paris.⁷ A woman, aged 25 years, took, upon an empty stomach, a large

teaspoonful of corrosive sublimate in powder. Symptoms: Vomiting; a smarting pain in the throat; violent diarrhoea; scanty urine, and, later, suppression; extreme weakness; tendency to stupor; slow articulation; swollen lips and tongue; dysphagia; pain and tenderness throughout the abdomen, with colic; death, ten days after ingestion of the poison. Anatomical appearances: Subpericardial ecchymoses; enlarged liver, with subcapsular ecchymoses; pale, swollen kidneys, with small ecchymoses in the pelvis; œsophagus reddened at its upper part, normal below; stomach showed a softened mucosa, with numerous ecchymosed patches and large, grayish ulcerations, most marked near the fundus; intestinal mucosa showed limited areas of deep reddening, with ulcerations, the changes in the large intestine being less than those in the ileum; the brain showed injection of the vascular meninges.

Mercury.—The following case of acute fatal poisoning by the inunction of mercurial ointment is reported by Sackur.^{Jan 20, July 16} A girl, aged 20, sprained her wrist. A few days later lymphangitis apparently supervened, for which mercurial ointment was applied and rubbed into some cracks on the hand. An hour after the inunction the patient felt ill, fainted, and vomited. On admission, the same evening, there was much swelling of the hand and of the arm on its dorsal aspect. An incision was at once made into the brawny and gray-colored tissues. The next day, January 16th, there was vomiting with tenesmus and slight albuminuria. Cultivation experiments were negative. On January 17th the vomiting was less frequent, but there was anuria. The stools were blood-stained, and the condition very like that of dysentery. There was no fever. On January 18th severe haematemesis occurred. Diarrhoea, with stools of almost pure blood, and anuria continued. On January 19th there were gangrenous gingivitis and glossitis, with moderate salivation. The prostration was great, but the mind remained clear. The following day there was a feeling of weight, and then paralysis, in the extremities, and the patient died. There were small haemorrhages and superficial sloughs in the mucous membrane of the lower part of the small intestine and the characteristic appearances of severe dysentery in the large intestine. In the kidneys there were well-marked necrotic changes in the epithelium, especially of the convoluted tubes. In

the absence of a clear history the diagnosis from sepsis was at first difficult, but there was no pyrexia or splenic enlargement, and the results of cultivation were negative. The amount of ointment used was small, but, as has often been pointed out, the broken skin must be taken into account.

Nitro-benzol.—Warfvinge, of Stockholm,⁶ has reported some cases of chronic poisoning by nitro-benzol, occurring among workmen employed in a factory using this substance. In one case, which was treated at the Sabbatsberg Hospital, there was severe headache during the first week, followed by lassitude and general debility, with fatigue after walking. After some time retching and vomiting with great loss of appetite came on and the bowels became confined, the stools having a reddish-brown appearance. The urine, too, was reddish brown and of a syrupy consistence. There was depression and restlessness at night and subsequently a feeling of formication in the fingers and toes, which rapidly spread to the hands and legs. A blowing sensation was complained of in the feet, which appeared to affect the whole of the body. The headache became more severe and was accompanied by giddiness and impairment of vision, with tinnitus in the ears. After this there were tremor in the upper extremities and impaired sensation in the upper and lower limbs, with, for two days, impairment of the power of speech. The patient, after three months in the hospital, recovered sufficiently to enable him to resume his work in the factory; but after having been there for four months he was obliged to apply for re-admission to the hospital, with somewhat similar symptoms to those existing previously. He presented much the appearance of a person with locomotor ataxy, but, after a month's treatment, recovered.

R. Prosser White, of Wigan, England,²⁸ has also made a study of the symptoms, chemical physiology, pathology, and treatment of nitro-benzol poisoning. The usual symptoms noticed are as follow: There are sleepiness, headache, and throbbing of the temples and forehead; great languor and depression are complained of, and the urine becomes darkened in color; the hands are moist, sometimes quite wet—this is probably accounted for by the fact that the benzol is intimately mixed with a deliquescent salt of ammonia in the manufactory. These slighter symptoms are, for all practical purposes, removed if the men are absent from

work for a few days. After such rest the men say that they feel in excellent health and spirits.

Upon more careful examination of the cases, it is found that those employed suffer from a very severe form of anaemia. The ruddy hue of health gives place to a uniform discoloration of the skin. The cheeks become pale, and the general surface of the body changes to a dull, dirty yellow cast, which does not disappear upon pressure. It has the appearance of jaundice, but is not so bright in tint. The exposed surface of the body, where the skin is thin, becomes darkened. This dusky color is of a blue or black cast, and gradually deepens with the amount of poison absorbed, but decreases as it is eliminated. These objective changes are most marked in the face, especially the eyelids, the tongue, and mucous membranes generally, so that the men appear as if suffering from partial asphyxia.

There is invariably a general loss of weight, and the muscles are flabby and weak. Drowsiness and tendency to sleep is very great in severe cases. The men say that it is almost impossible to keep their eyes open. During the night they sleep soundly, unless prevented by the incessant headache which is a constant symptom. In the morning they awaken unrefreshed and heavy. The headache is very intense and chiefly situated in the frontal and temporal regions. It is described as a quick succession of tappings inside the brain. It is increased by stooping or when the head is laid upon the pillow in bed. Giddiness, though sometimes present, is not a prominent symptom in the early stages. Great apathy and irritability of temper are generally experienced. Slight noises and little annoyances are resented. The appetite is at first good, but soon becomes capricious, and, later on, fails altogether.

Nutmegs.—Reported by George E. Reading, of Woodbury, New Jersey.⁸⁰ A woman, three months pregnant, was advised by a friend to take six nutmegs, in powdered form, to produce a miscarriage. She procured the nutmegs and grated them, and tried to swallow the entire mass; but when she had taken half the powder she felt nausea so strongly that she desisted, through fear of losing the portion already taken. Three hours after this she vomited freely. There followed low delirium, hallucinations, laughter without cause, and apprehension of death. The effects reminded the reporter of the toxic symptoms due to cannabis Indica. The

delirium continued about eighteen hours. The following day, only a little depression continued. There was no miscarriage.

Opium.—Drzewiecki, of Warsaw, Poland, corresponding editor, contributes the following note of a case reported by Jerzykowski.⁷⁸⁸ A mother gave her infant, 10 days old, 1 teaspoonful of syrups opii. Five hours later, Jerzykowski found profound coma; contraction of the pupils; rare and irregular respiration; face slightly reddened; cold sweat on the whole body; no reflex, and cyanosis of extremities. After three hours' artificial respiration it revived, but only for ten minutes, after which a relapse took place. After two hours' artificial respiration, pulse and respiration improved. Camphor-oil, coffee, and cognac were administered; coma lasted ten hours longer, but with good pulse and respiration. A few days later there was severe constipation.

Paraldehyde.—Thomas Mackenzie, of Douglas, England,^{2, m} contributes the following case to the literature of paraldehyde poisoning: A woman, at 11 o'clock P.M., took by mistake 3½ ounces (108.8 grammes) of paraldehyde. She was found, the following morning, in a deep stupor. The breath had a very strong smell of paraldehyde; the face was slightly flushed; pupils were moderately contracted and quite insensible to light; pulse was 120, respirations 40, and the skin was warm. She was wholly unconscious and absolutely limp, like a person deeply under chloroform.

At 3 P.M., sixteen hours after the dose was taken, the pulse at the wrist became almost imperceptible, the breathing became very rapid, and coarse, bubbling râles were heard all over the right lung. By 4 P.M. the pulse was again perceptible, and the respirations were 60 per minute. At 6 P.M. strong ammonia produced a slight effect, but she remained quite unconscious. The urine, on being drawn off, was found to be redolent of paraldehyde.

At midnight the respiration was stertorous, the face was flushed, and the skin was acting very freely. At 5 A.M. the enema of beef-jelly and spt. ammon. aromat. was rejected, and the patient showed slight signs of returning consciousness. At 9 A.M. she opened her eyes, but she was still quite dazed and unable to speak. From this time she gradually continued to improve, until by 4 P.M. she had so far regained consciousness as to whisper "Yes," in answer to a question. It was thus thirty-four hours before she

opened her eyes, and forty-one hours before she was sufficiently awake to understand and reply to a simple question.

Strychnia.—The following case of recovery after a large dose of strychnia is reported by Wallace and McKae, of Turriff, New Brunswick.²: A man, aged 65 years, with suicidal intent, swallowed 20 grains (1.33 grammes) of strychnia sulphate. Ten minutes later energetic treatment was begun: apomorphia subcutaneously; mustard and water for emesis; the stomach-pump for emptying and washing out the stomach; tannic acid as an antidote; and, finally, chloral hydrate and potassium bromide. Twitchings and jerkings of the muscles of the limbs and tetanic spasms of the muscles of the lower jaws, with violent contractions of the oesophagus, were the most noticeable symptoms. The effect of the emetics was very prompt, extremely violent emesis occurring alongside the oesophageal catheter almost immediately after the introduction of the tube into the stomach. The man was busy at his work four days after his misadventure.

Sulphonal.—I. Reported by Ernst Neisser, of Berlin.¹³⁹ A druggist's apprentice, 15 years old, took 100 grains (6.48 grammes) of sulphonal. When first observed, he had a temperature of 96 degrees, and was profoundly unconscious; respiration easy and quiet; pulse 100, rather small, but regular. The patient's condition was not alarming, and he was treated during the night with warmth and excitants.

On the following morning the patient was quietly sleeping; the countenance slightly reddened; the mouth closed; the respiration quiet (18) and deep; pulse 96 and extremely variable; reflexes uncertain, except that the corneal reflex was always distinct. The pupils, of medium dilatation, reacted to light, returning immediately to their former size. The patient did not react to cries and shaking. Pricking of the face, hands, and feet produced no effect, except a distinct widening of the pupil.

About 1000 cubic centimetres (one quart) of urine were passed daily by the patient, who always retained the repeated injections of small amounts of water, although he received nothing by the mouth. There was neither albumen nor sugar in the urine. Jaffe was able to detect sulphonal in it, excreted unchanged.

On the third and fourth days the patient slept soundly. He reacted better to irritants, but without awaking. The tempera-

ture, which at his admission was 96° F., rose to 101.3° F. on the fourth day, fell to normal on the second day, rose to 100.8° F. two days later, and then fell to normal, where it remained. On the part of the lungs there was nothing pathological. The pulse had now become good, and the respiration peaceful. No defecation. On the fifth day the patient opened his eyes repeatedly, but was completely unconscious. The pupils were wide and reacted sluggishly. After a time, languid answers came in response to energetic questioning. His speech was slow and labored. He immediately fell asleep again. On the sixth day he answered questions slowly but rationally, and took nourishment by the mouth. He imagined he was on a ship (dizziness?). In the course of the day he could see everything. Ocular field normal. He could not stand or walk without assistance. On the palmar surface of both wrists there was an itching exanthem of numerous small, pale-red papillæ, as large as the head of a pin. On the seventh day the patient was in full possession of consciousness, yet felt dull and dizzy, and remained in bed.

On the eighth day the exanthem had faded. The patient left his bed and was dismissed on the following day in perfect health. He had taken the whole of the contents of two boxes of finely powdered sulphonal, of 50 grammes ($1\frac{1}{2}$ ounces) each, and had washed down the largest part with considerable amounts of water. Thereupon he went into the open air and walked about three-quarters of an hour. He could give no account of himself after this time. After about six hours he was found unconscious, was made to vomit, and was then brought into the clinic.

An extraordinarily large amount of sulphonal was absorbed, for the patient did not vomit until six hours after its ingestion, and after an unconsciousness of five hours. A part had, without doubt, already passed into the intestine. Furthermore, the patient had no movement of the bowels until the fifth day, and unchanged sulphonal was excreted in the urine. The favorable outcome is to be explained by the slowness of the process of absorption in the alimentary canal, caused by the difficult solubility of the sulphonal (according to Kast, 1 to 200 in the gastric juice at the body-temperature) and its rapid excretion by the urine. Hence, the importance of free diuresis in such cases. The case shows that

sulphonal does not possess a cumulative action, provided that the secretion of urine continues to be sufficient.

II. Reported by Kober.³¹⁹ A man, aged 52, became very melancholic in consequence of increasing deafness, and more particularly of tinnitus. The sleeplessness was treated by bromide salts and sulphonal. The latter was given in doses of 0.5 to 1.5 grammes ($7\frac{1}{2}$ to 23 grains),—the larger dose rarely,—and continued during four to five weeks. After a temporary improvement repeated vomiting, abdominal pain referred to the navel, and obstinate constipation supervened. A change in the urine was also noted. The daily quantity was under 1 litre (1 quart). It was Burgundy red to reddish black in color, and contained, at first, no albumen and never any sugar. It did not give exactly the tests for haemoglobin. Heller's reaction was absent. The specific gravity was 1021. The coloring matter was partly thrown down by alcohol. The crystals thus obtained were soluble in water, not in ether and chloroform. The chloride salt was taken up by amyl alcohol with a red coloration. Lead oxide precipitated and took up the coloring matter; when treated with acetic acid and common salt, haemin crystals were obtained. No sulphonal was present. The sulphonal was omitted, but the color of the urine deepened, albumen and formed elements—leucocytes, casts, but no red cells—being found. Then retention of urine supervened, and, later, death. It would appear that the sulphonal was stored away somewhere in the body, possibly in the liver. The absence of albumen at first would apparently prove that the excretion of haemoglobin could produce a true renal inflammation.

III. The ANNUAL'S corresponding editor, J. Levison, of Stockholm, Sweden, states that Geill and Fehr³⁷³ mention cases of poisoning by sulphonal; one case was fatal.

MEDICAL DEMOGRAPHY.

BY F. LEVISON, M.D.,
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France.—The depopulation of France still occupies the minds of French demographers to a great extent. The question has already been discussed in the ANNUAL of 1892, but the causes, effects, and possible remedies for this national evil have continued to be largely discussed.

Pietra Santa, corresponding editor of the ANNUAL, reports the discussions at the Académie de Médecine of Paris, which were terminated by a series of conclusions aiming at various sanitary reforms in order to diminish the mortality, especially of infants. But as the depopulation depends as much on the decrease in the number of births as on the increase in mortality, it is very dubious if the execution of these reforms will produce the desired effect.

The official statistics, cited by Pietra Santa, show the proportion of the births and the deaths to be as follows:—

1881,	.	.	.	.	.	108,229 more births than deaths.
1885,	.	.	.	.	.	87,661 " " " "
1887,	.	.	.	.	.	56,538 " " " "
1888,	.	.	.	.	.	44,772 " " " "
1890,	.	.	.	.	.	42,520 fewer " " " "

The depopulation is not only remarkable in towns, where so many causes co-operate to bring it about, but is to be noticed also in rural communities. Dumont²⁰⁸ gives the history of Saint-Germain-des-Vaux, a small community of farmers and fishermen residing at the end of the peninsula of la Manche, in Normandy, and maintained in a perfect state of racial purity by the total absence of immigration for centuries. By consulting the parish registers, which have been kept very regularly for the last two centuries, Dumont has been able to make up the statistics of Saint-Germain-des-Vaux; and, comparing the results of the

cinquennial census with the registers, he shows, by several tables, that the parish during the last sixty years has lost half of its population, and that many families, formerly prosperous, have now totally disappeared, while others are represented only by a very small number.

Several authors endeavor to condone the feeble fertility of the French population by the fact that its increase has always been very slow. Levasseur²¹² states that in the years 1700–1801 the population of France augmented from 20 millions to 27.5 millions, and that this increase was partly due to the acquisition of Lorraine, Corsica, and Comtat-Venaissies. From 1801–1886 the increase was from 27.5 to 38 millions.

Humbert Mollière²¹³, finds that the population of France remained almost stationary in the first four centuries of our era, and he considers it characteristic of the Celtic race to augment very slowly.

Jeannel²¹⁴ has collected evidence to prove the disastrous influence exercised on natality by the destruction of the woods in certain "departements" of France. The total increase of the population of France in the years 1886–1891 was only 124,289, which, if all the eighty-two departments are calculated to have the same number of inhabitants, would give an increase of 1428 for each. Now, seventeen of these departments are so deprived of wood that the government has been obliged to plant trees at public expense, and in thirteen other departments funds have been provided for that purpose by private individuals. For these thirty departments, where the population should have increased at a rate of $30 \times 1428 = 42,840$, it has diminished 89,632; and this decrease would be still more pronounced if only the rural communities were taken into account, as some of the great towns contained in the above-mentioned departments have considerably augmented in the same period. The conclusion is that the government, as well as private citizens, should take necessary steps to cultivate trees.

Vaunacque²¹⁵ and Turguan²¹⁶ believe that among the causes which have contributed to the decrease of population in 1890 the epidemic of *la grippe* has been the most important. Turguan demonstrates, by tables of mortality for the different months of the year, that the surplus of deaths occurred in the first four months

during which the epidemic was raging. In January there were $26,452 = 35$ per cent. more deaths than in the corresponding month of 1889; in February the surplus was $11,983 = 18$ per cent.; in March the surplus mortality was reduced to 6834, or 8 per cent., and in April the mortality was not greater than the average. In all, the epidemic of *la grippe* caused about 40,000 deaths. Paris was first attacked, and suffered very severely. The towns of the provinces caught the disease somewhat later, but also in a very severe form; in the country the epidemic came later, persisted for a long time, but was not so fatal in its results. It is impossible to learn how many persons were attacked, but the statistics of the army show that in the month of December, 1889, the seventh part of the French army was on the sick-list, the number of patients for the months of January, February, and March equaling about one-half of the army. In the civil population the proportion was about the same. The fatal influence of the epidemic on natality is proved by the official registers of births. In the month of August, 1890, this showed nothing abnormal, but in the month of September there were 8000 less than in the corresponding month of 1889; in October there were 12,000 less, and in November 6500; in December the births regained the ordinary number.

Dumont²¹⁷⁴ has, perhaps, given the most plausible explanation of the cause of depopulation when he states that the increase of natality is in inverse proportion to the efforts of the individual to climb the social scale, and that the development of a nation in numbers is in inverse proportion to the refinement and social ambition of the individual. This accords with the opinions of Herbert Spencer. In France two millions of households are without children.

Delauney⁸ has made some interesting calculations on the mortality of different ages in France. The tables of Millard show the number per million individuals born in the same year that survive from year to year, the difference between two subsequent numbers giving the number of deaths in the period between the two ages; when the numbers thus obtained are compared, the tendency to death at certain ages is shown, or, as Delauney calls it, the acceleration of death at each age. The mortality diminishes from 1 to 16 years of age; increases from 16 to 32 years of age;

diminishes from 32 to 54 years of age; increases from 54 to 82 years of age; diminishes above 82 years. It is peculiar that after the maxima and minima of 32, 54, and 82 years a sort of inversion takes place; after the maximum, 32 years, there is a minimum at 33 and a maximum at 34 years; in the same manner the minimum at 54 is followed by a maximum at 55 and a minimum at 56 years; the same is noticed at 82 years, but at 16 years it is not so obvious, on account of the small variations of the acceleration of death at that age. The relatively favorable periods of life are from 1 to 16 and from 32 to 54 years, as well as after 82 years, while the periods from 16 to 32 and from 54 to 82 years are more unfavorable. By the results of these calculations a natural division of life is established: childhood, from 1 to 16 years; youth, from 16 to 32; the ripe age, from 32 to 54; old age, from 54 to 82; senility after 82.

Bertillon ²⁰⁸ discusses the bill by which it is proposed to reduce the taxes in proportion to the number of the minor children, and mentions on this occasion the distribution of the French households. According to the census of 1886 there were, in France:—

	Of 100 Households.
Bachelors over 30 years,	1,470,872, 12.4.
Households (married couples, widowers, widows, etc.) without children,	2,073,205, 17.4.
Householders with 1 child,	2,542,611, 21.3.
Householders with 2 children,	2,265,317, 19.1.
Householders with 3 children,	1,512,064, 12.7.
Householders with more than 3 children,	2,032,184, 17.1.
	<hr/> 11,896,198

While the feeble fertility is a source of constant apprehension to French demographers, France can boast of a more equal division of national wealth than most other countries. An anonymous author ²⁰⁹, has calculated that of 1000 households 500 are occupied in cultivating the soil; 250 are cultivating their own property; 100 are landowners working on the properties of others; 135 are farmers, land-tenants, etc.; 15 are foresters, charcoal-burners, wood-cutters; 343 in industries, etc.; 167 in small industries (smiths, joiners, etc.); 105 in trade; 22 in transportation of passengers or merchandise; 15 in public service, as soldiers, policemen, etc.; 43 in the liberal professions; 38 living on incomes; 2 of no profession or class (vagabonds, etc.). The number of proprietors

is greater than the number of non-proprietors. In regard to houses the number of proprietors to lodgers is 5 to 3 or 4. The women take a very active part in the work; about one-fifth of the management of agricultural, industrial, or commercial interests is directed by women.

Among the demographical essays published in France must be noted that of Labit, ²⁴³ ~~May, June~~, who gives a very elaborate description of this part of France and of its population.

England.—As stated in the ANNUAL of 1891, the population of England, as in many other countries, has a great tendency to leave the rural districts and concentrate in towns. Poore ⁶ ~~May 14~~ demonstrates that this movement is still going on, and that one of its effects is the deterioration of physical health. In 1801 London contained one-eleventh of the population of England and Wales, whereas, according to the last census, it was found to contain about one-seventh of the entire population. The Registrar-General's returns show that for every 100 deaths in country districts there are about 120 in London, and that the death-rate of children under 5 years, per 1000 living at that age, was (in the year 1890) in London 65.2 and 66.5 in Lancashire, as against 30.3 in Dorsetshire, 31.1 in Wiltshire, 31.8 in Berkshire, etc. Again, in London, there is a great difference between the outlying districts (as Hammersmith, Hampstead, etc.), the middle districts (as Kensington, Chelsea, Paddington, etc.), and the central districts. This is demonstrated by the following table of mortality:—

	1890.	1891.
Outlying districts	18.4 per 1000	18.0 per 1000
Middle districts	20.4 " "	21.0 " "
Central districts	25.6 " "	25.4 " "

Still, London is a healthy place in comparison with New York, which, in 1890, had a population of 1,600,000, of whom more than 1,200,000 live in tenement houses. The average death-rate for the past ten years was over 26, and in the year 1890 the deaths exceeded the births by 980, and rather more than 26 per cent. of the children died before they were a year old.

Ogle ⁶ denies that it is proper to speak of a rural depopula-

tion in England, since the rural population in 1891 exceeded that in 1881 by more than a quarter of a million, and he asserts that the increase would have been much larger if a great portion of the surplus had not immigrated to towns or emigrated. The increase of the rural population has for the past ten years been 3.4 per cent. The small increase in the population engaged in agriculture must partly be attributed to the decrease of arable land and the increase of permanent pasture. In 1871, 54.5 per cent. of the average of Great Britain was under grass, while in 1891 the proportion had increased to 63.6 per cent. of the whole.

According to the report of Fayerer to the Congress of Hygiene at London, the expected duration of life in England was:—

	For Men.	For Women.
1884-1854,	39.91 years.	41.85 years.
1871-1880,	41.35 "	44.66 "

The death-rate diminished from 24.9 per 1000 in the years 1846-1855, to 17.85 per 1000 in the year 1889. According to Cameron,¹⁶ at the end of the period of 1881-1890, the average death-rate of the 28 largest towns of England was 23 per 1000; in Manchester it was 29; in Portsmouth, 19.6; in Brighton, 19.3; in Norwich, 19.1. In the rural districts the death-rate was 17 per 1000.

Prussia.—In Prussia²¹⁸⁶ the mortality in 1888 was as follows:—

	For Men.	For Women.
Average mortality,	24.2 per thousand.	21.6 per thousand.
From 0-1 year,	25.2 " "	21.0 " "
" 1-2 years,	60.7 " "	58.8 " "
" 2-3 "	29.3 " "	28.4 " "
" 3-5 "	16.8 " "	16.8 " "
" 5-10 "	6.9 " "	7.1 " "
" 10-15 "	3.4 " "	3.8 " "

In the year 1890,²¹⁸⁷ in the 229 German towns of more than 15,000 inhabitants (in all 11,350,000), the number of births was 36.1 per 1000 inhabitants; number of still-born, 1.2 per 1000 inhabitants; number of deaths, 24.6 per 1000 inhabitants; 23.7 per cent. of the living children died in the first year of life.

In Bavaria, in the year 1888, the natality was 35.8 per 1000; the mortality in the Palatinate, 24.1; in the rest of Bavaria, 29.0.

Vienna had in 1890²¹⁸⁸ a natality of 32 per 1000, a mortality

of 24.7. In the decade from 1871 to 1880 the average mortality amounted to 29.19; in the decade from 1881 to 1890, 23.84.

Denmark.—In Copenhagen,²¹⁷⁵ in the years 1870 to 1880, the increase of population was 262 per 10,000 inhabitants, but from 1880 to 1890 only 215. Of these, 100 were immigrants, the additional difference being caused by the number of births being greater than the number of deaths. If the last 20 years be divided into 5 periods of 4 years each, the number of marriages was 101, 97, 96, 94, 83, per 10,000 inhabitants; the number of children born in each quattuordecim was 332, 365, 372, 375, 339; the death-rate was 256, 235, 231, 226, 216 per 10,000.

United States.—Turguan has, according to Gannet, ²⁰⁸ given some interesting details concerning the population of the United States. Gannet has calculated the density of population for each square degree, viz., the area limited by two consecutive degrees of latitude and longitude; of course, these squares are not of equal size, but smaller in proportion to their distance from the equator. The number of inhabitants is also much influenced by the presence or absence of great towns. The largest part of the population resides between the sixty-eighth and one hundredth degrees of longitude; but the centre of gravity is constantly proceeding toward the West. In 1790 the centre of population was close to the Atlantic Ocean, but has since then constantly advanced toward the West for the last hundred years. It is now between the eighty-fifth and eighty-sixth degrees of longitude, and is advancing with a rapidity of about nine kilometres a year. The population is rather regularly grouped on both sides of the fortieth degree of latitude. In the zone limited by the fortieth and forty-first degrees of latitude the population is most compact. Here also are found the great towns of New York, Brooklyn, etc.

Turguan ²⁰⁸ has also collected some facts concerning the number of the different races. The total number of inhabitants in the United States was 66,622,250, of whom 54,983,890 were white men and 7,638,360 colored; 9,249,547 were immigrants and 53,372,703 were born in America,—among these almost the whole colored population, which for the past ten years has only increased to the extent of 13 per cent., only a third of the increase of the white race. In 1850 they numbered 16 per cent. of the whole population, but now are only 12 per cent. Besides the 7,470,000

negroes and descendants of negroes, there are in the United States 107,475 Chinese, 2039 Japanese, and 58,806 Indians. The Japanese have only lately begun to immigrate to the United States; in 1880 there were only 148; now there are more than 2000, mostly in California. The Indians number 58,806, but, as many tribes are constantly wandering about, it is difficult to obtain a correct census. Their number, however, is constantly diminishing.

South Sea Islands.—In many of the South Sea Islands the population is fast diminishing. Marestang ²⁰⁸ states that in each 1000 inhabitants of the Marquesas Islands the yearly mortality is 21.18 per cent. greater than the natality. Pulmonary phthisis is very common, develops with rapidity, and is very infectious. Other diseases contribute to the depopulation, but the chief factor is the low natality, which is only 19.71 per 1000.

Equatorial Countries.—In many regions it seems that the indigenous races cannot live where the white man has penetrated, but, on the other hand, the reverse is the case in the tropical zone. Levasseur ¹⁵⁹ states that the sedentary population in Senegal, which should be acclimatized, had, in 1889, as in almost every year, 1721 deaths, as against 1469 births. In Congo the proportion is almost the same. Globus ²¹⁷⁶ gives some statistics of the mortality of French soldiers in the colonies. The death-rate of young men of 20 to 30 years of age is, in France, 8 to 10 per 1000; the death-rate of

Soldiers in France,	9-11.
" Algeria,	11-12.
Soldiers in the West Indian Islands,	91.
" Pondichery,	37.
" Cochin-China,	18-22.
" Tonkin,	40.
" Reunion,	19-20.
" Senegambia,	78.

The World in 1992.—Richet ²⁰⁸ endeavors to presage the development of humanity in the next one hundred years, in regard to numbers, food, means of communication, distribution of power and wealth, etc., should evolution continue in the same ratio as in the past one hundred years. According to his conclusions, in the year 1992 the population of Russia will have augmented from 110,000,000 to 340,000,000, Germany from 44,000,000 to 115,-

000,000, France from 38,000,000 to 50,000,000, Austria from 42,000,000 to 80,000,000, and the United States from 64,000,000 to 400,000,000, etc. The author is of the opinion that there is no reason to dread that these multitudes will lack sufficient food; even if the present number of men were doubled, there would be no difficulty in finding the necessaries of life.

Marriages, Births, etc.—Simpson²² considers the question of marriage from the stand-point of gynaecology. The tables of mortality given by Bertillon²¹⁷⁸ show that celibacy is not favorable to health, and that the death-rate of bachelors and spinsters is considerably greater than that of husbands and married women of the same age. This is more distinctly the case with men, among whom, between the ages of 20 and 25, there is a mortality of 12.88 per 1000 among bachelors, and of 8.92 among married men; the difference is still more striking at a more advanced period of life, as between the ages of 40 and 45 years. At that period there is a mortality among married men of 9.55, whilst among bachelors it is 11.62, and among widowers 16.89. For women the benefit of marriage is not so evident, since the dangers of child-bearing, to some degree, neutralize it; but at a later period of life married women show a far greater vitality than spinsters.

The Marriageable Age.—Bertillon's tables show that the mortality of married males prior to the age of 20 is extremely high, whereas the mortality of unmarried youths between the ages of 15 and 20 is only 6.89 per 1000; those who marry under 20, usually between 18 and 20, show a mortality of 51.32 per 1000. The beneficial influence of marriage is manifest at 23, still sensible at 22, but is absent at 21.

The danger of early marriage is not so pronounced in the case of women as in men. The proportion of deaths per one thousand for the unmarried women between 15 and 20 years of age is 7.53, and for the married, at the same age, 11.86. Between the ages of 20-25 the mortality among the unmarried is 8.32, and among the married 9.92. (All these statements are calculated from Bertillon's tables of mortality in France.) The conclusion is, that it is not advisable for a woman to marry before the age of 20. In regard to the number of children, Simpson points to the fact indicated by Eddes and Thomson,²¹⁷⁹ that the survival of a species or family depends not primarily upon quantity, but upon quality.

The ideal is not the production of many children, but of a moderate number of children, who are more likely to be healthy and well provided for. Now, Malthusianism might secure this by its more or less mechanical method; but it has other dangers, and Simpson therefore urges the necessity of an ethical rather than a mechanical prudence after marriage.

Strahan also warns against early marriage as a source of large, feeble, and non-self-supporting families. That the children of immature youth are feeble and ill-developed is proven by the fact that at the conscription of 1826 in France, out of a total drafting of 1,033,422 young men, fully 380,213 were returned to their homes, owing to the fact that they failed to reach the minimum height of four feet ten inches required by the army regulations. The small stature of the Frenchmen at that period was, according to French hygienists, caused by the fact that, during the wars of the Empire, many marriages between immature youths took place in order to avoid conscription.

J. Körösi presented to the Seventh Congress of Hygiene and Demography a memoir on the influence of the age of parents on the vitality of their children. The memoir was based on statistical observations made on the causes of death in 29,813 children. There were two groups of causes: (1) those acquired *in utero* (weak constitution, premature births, inanition, and atrophy); (2) extra-uterine causes, arising during life. The observations extended over a period of five years. The following table for every hundred deaths is given:—

Age of Mothers.	Weak Disposition, Per Cent.	Other Uterine Causes, Per Cent.	Diarrhoea, Per Cent.
20 and under . . .	35.20	23.31	26.29
20-30	21.65	14.31	21.89
30-35	14.04	12.85	18.05
Above 35	15.85	18.45	19.25

Seven years of almost consecutive observation of mothers under the age of 20 years gave the result that the deaths from inherited debility in the children were 8 per cent. greater in mothers from 18 to 19 years of age than in those from 19 to 20. The infants of the youngest mothers, when compared with those of mothers at and above 35 years of age, were subject to the following death causes, at the following ratio: To diarrhoeal disease, 50 per cent. oftener; to rachitic disease, 75 per cent.; to

consumption and hydrocephalus, 100 per cent.; to atrophic diseases, 200 per cent.

In regard to the age of fathers, the result of the observation indicated that the best progeny issued from fathers aged between 30 and 40 years, the children of fathers either above or below those ages being more subject to death from hereditary causes. A singular fact noted by Körösi was, that the children of fathers who had passed the sixtieth year had an increase of vitality over those of the fathers from the younger decade. Körösi advises that girls should not marry before the age of 20, and states that in Hungary, among Roman Catholics, 18 per cent. marry below the age of 20; among Protestants, 12 per cent.; among Jews, only 10 per cent. In England, about 12 per cent. of the brides are below that age; in the United States there are no statistics on the question for the whole country, but in some States statistical information may be obtained.

The "Vital Statistics for the State of Indiana" give the same percentage as in England; out of 33,912 births, 309 had fathers under the age of 20 and 3123 had mothers under the same age. Michigan, in 1889, furnished the following statistics¹⁰⁸²: —

BRIDES.		BRIDEGROOMS.	
Under 12 years	1	Under 19 years	1997
" 15 "	18	" 20 "	1885
" 16 "	885	Under 18 years	97
" 17 "	1145	" 19 "	246
" 18 "	2006	" 20 "	608

Rubin and Westergaard²¹⁸¹ have calculated marriages according to the census of 1880, in Copenhagen, with regard to age, duration, and fertility in the different social strata. The authors divide the population into five groups: 1. The liberal professions, manufacturers, men of business, etc. 2. Tradesmen, small industries, inn-keepers, etc. 3. Clerks, institutors, etc. 4. Waiters, subaltern employés, etc. 5. Artisans, laborers, journeymen, etc. In the upper classes the marriages are of longer duration than in the laboring classes, in which, for bride and bridegroom, there is less expectation of long life. The average age of marriage is, in Copenhagen, 28 for men, 26 for women; in the first class, the age of marriage is 32 years for men, decreasing from group to group, and reaching its minimum in the fifth, where it is of 27.5. For

women no such difference is found. An inquiry into the age of marriage among the rural population has shown the same difference between the better-situated classes and the laborers; the age of marriage among the proprietors of small farms is 32 to 34 years.

In Copenhagen, of 16 young men over 16 years who live to the age of 45 years, only 9 remain bachelors; of 100 women, 17 remain spinsters. The fertility of marriage is, in the different groups, as follows: Number of children for 100 married couples in the third group, 422; fourth group, 460; first group, 473; second group, 492; fifth group, 508. The third group (clerks, institutors), struggling to maintain their position in the community, cannot afford to have many children; in the first and second class, that of the more well-to-do, the number increases, and reaches its maximum in the laborers, who are less provident, and have not much to lose by procreating a greater number of children. Of the marriages, about 11 per cent. are sterile. The average number of children per household is 3. In marriages of 15 years' duration there are:—

	3d Group.	1st, 2d, 4th Groups.	5th Group.
0 children	15 per cent.	13 per cent.	11 per cent.
1 to 4 "	46 " "	41 " "	36 " "
5 and above	39 " "	46 " "	53 " "

In the fifth group, 16 per cent. of the marriages have 9 children or more, but of course the mortality of the children is also greater in this class, and the death-rate increases, not proportionately to the number of children, but progressively. In marriages of 10 to 14 years, the death-rate of the children is: 1 to 4 children, 22.6 per cent. died; 5 to 8 children, 30.2 per cent. died; 9 to 12 children, 49.5 per cent. died. This increase of mortality is most prominent in the fifth group, while in the first a great fertility may coincide with a low death-rate:—

	1st Group.	5th Group.
In marriages with 2 children	15.0 per cent.	19.1 per cent.
" " 4 "	20.8 " "	23.4 " "
" " 6 "	22.5 " "	31.1 " "
" " 8 "	28.8 " "	40.8 " "

When the children are born very soon after each other, the death-rate is greater than if the interval be of some years.

When, in a marriage of 5 years' duration, there are 4 children, the death-rate is 39 per cent.; when there are 6 children, the death-rate is 47 per cent. Marriages lasting from 5 to 9 years, with 6 children, have a death-rate of 39 per cent., being the same mortality as with 4 children procreated in a period of 4 years.

Westergaard²¹⁸² gives statistics showing that the age of the parents is not of great importance as regards the expectation of life in the offspring, thus disagreeing with Körösi. Regnault⁸_{Sept. 17} discusses the question of consanguineous marriages, and comes to the conclusion that these are not always prejudicial to the progeny; but that this is probably the case when bride and bridegroom are not only related by blood, but are also born and brought up in the same locality, and especially if they are members of a small and isolated community. This explains why the Roman Catholic Church so severely interdicted marriage between relatives in feudal times, when the difficulties of communication and the constantly-existing feuds almost constrained the inhabitants of each small hamlet to intermarry.

Westergaard²¹⁸³_{v.14} has made use of the statistics collected by the National Life Assurance Society to calculate the expectation of life of the members of families where fathers, mothers, or one of the children died from pulmonary phthisis. The conclusions, which are proved by several tables, are that the death-rate of these families is higher than the average death-rate, and that this difference is especially manifested between the ages of 15 to 35 years.

The death-rate, as calculated for the whole population, and as observed in the phthisical families registered by the Society, is:—

AGE.	MEN.		WOMEN.		TOTAL.	
	Observed Deaths.	Calculated Deaths.	Observed Deaths.	Calculated Deaths.	Observed Deaths.	Calculated Deaths.
1-15 years	48	21.3	27	20.9	70	42.3
15-35 "	169	119.7	176	103.4	345	223.1
35-65 "	151	132.7	101	105.4	252	238.1
	868	273.7	804	229.7	667	508.4

Of the total number of deaths from the ages of 15 to 35, 170 were caused by pulmonary phthisis and 175 by other diseases,

whereas the proportion in the average population was as 2 to 3. Phthisis of the mother, or of one of the children, seems to be more prejudicial to the vitality of the remaining members of the household than when the father is attacked by phthisis. When two deaths from phthisis have occurred in a household, the expectation of life of the remaining number diminishes very much.

Comparative Physiology and Pathology of the Human Races.—The question as to the diminution of the jaws in civilized races is still under discussion. Ball asserted in 1891 that by carefully weighing a number of Australian, Negro, and English jaws, in the possession of the Museum of the Royal College, he found the difference to be very slight. Howard Collins²¹⁸⁴ is of the opinion that the jaws of civilized races have manifestly diminished. He substituted mensuration for weighing, and, by comparing the measures with the capacity of the skull, comes to the conclusion that the modern English jaws are, roughly speaking, half the size of those of the Australian, relatively to the skull, and a ninth less than those of the ancient British. As Collins has only measured thirty skulls and jaws, the question cannot yet be regarded as definitely settled.

Carlier²¹⁸⁵ has made some observations upon the results of the examination of recruits in the Department of Evreux, France, for the past nineteen years: the average size of young men is 1.66 metres, while the average size of the recruits of France is only of 1.641 metres. The size is influenced partly by heredity, partly by other conditions. Paupers and persons residing in unhealthy localities show a minimum size, while the better-situated are taller. The author gives several tables in which the recruits are grouped according to profession. At the head of the list are students, 1.90 to 1.94 metres; tanners and chairmakers, 1.66 to 1.70 metres, the land-tenants and servants, 1.42 to 1.46 metres.

Regnault²¹⁸⁶ has studied the foot of the Hindoo. Every traveler has observed how well the Hindoos in the bazaars in India, occupied as joiners, potters, weavers, employ their feet as prehensile instruments. As the most curious example of this use of the foot the author mentions that the Hindoo butcher holds the knife between the first and second toe, with the edge downward, and seizing the piece of meat with both hands, cuts it through by

drawing it toward himself. In all these occupations the workman is sitting on the ground with his knees against his breast, and supporting himself only on the tuber ischii and the feet. The above-mentioned use of the foot is made possible by the movements of abduction and adduction which the Hindoo is able to execute by the first toe.

Regnault measured the feet of a Tamoul of Trichinopoly, and found that at the base of the first two toes there was a distance of ten millimetres in the right and sixteen millimetres in the left foot; even by approaching the toes as much as possible he could not make them touch each other. This peculiarity is very common, but not invariable among Hindoos. Of thirty-seven examined cases, it was found in eight. Among the Bengals the same peculiarity is frequently found, but among the Cinghalese it is rare. On account of the anatomical disposition of the toes, the lower races of India can make use of an irregular sort of wood sandal, only held on by a cylindrical piece of wood projecting between the first and second toe.

It is commonly known that in India alimentation consists almost exclusively of vegetables, but in the sect of the Jains the law of Manon "not to kill anything living" is executed to the letter. Theuriet²⁰⁸ _{Sept. 17} mentions that these Jains day and night wear a piece of fine linen protecting their mouth and nose from the danger of swallowing some small creatures with the respired air; for fear of eating some living being in the water they drink, this must be boiled before use, but not by the Jain himself. When the Jain goes out, he always wears a broom to sweep every small insect from his path.

In the United States, where negroes and white men live under similar hygienic conditions, there is a good opportunity to compare the pathology of the two races. Reyburn²⁰⁹ has, from an analysis of 22,053 cases in white patients and 152,141 cases of disease among negroes, treated by the Medical Department of the American Bureau of Refugees in the years 1865-1872, drawn certain conclusions as to the proclivity of the African race to particular types of disease. The author states that there is no difference as regards the susceptibility to remittent and intermittent fevers, and the statistics give no support to the commonly-made statements concerning the extreme liability of negroes to scrofulous

disease and pulmonary tuberculosis. The deaths from typhoid fever amounted to 25 per cent. of the patients, this high mortality being dependent on the frequency of severe intestinal lesions. The death-rate of diarrhoea and dysentery was also high. Delirium tremens was very rare among the colored race, but alcoholism seemed often to lead to epileptiform convulsions or mania. The negroes have not so great a power of resistance to acute inflammations, such as pneumonia, as the whites, but they have a greater reparative power after injuries or surgical operations.

Sholl⁷⁹ compares the death-rate of the negro and the causes of death in the black race with those of the white man. The author points out some anatomical differences, and especially the fact that, from numerous autopsies, the brain and the lungs of the negro have always been found much less in weight than those of the white man. From the report of the health-office of Birmingham, Ala., for the period from January 1, 1890, to May 1, 1891, Sholl has collected some interesting statements. The population of the town of Birmingham, excluding the suburban districts, is estimated at 27,000, of which 17,550 are whites, 9450 colored. During the 16 months of the observation there were 57 deaths from pneumonia among the whites,—3.27 per 1000,—and 65 from the same cause among the negroes,—6.88 per 1000. Of deaths by consumption among the whites during the same period there were 21; among the negroes, 63. Nearly one-half of the mortality of the negroes may be set down to pulmonary diseases. The reasons for this great mortality are, according to the author, the great prevalence of syphilis among the negroes and the immoderate use of liquor, which render the negroes and their offspring more liable to all diseases.

Dixon⁸⁰, has, after a practice of thirty years, reached the conviction that the offspring of mulattoes is subject to constitutional disease to a greater degree than the offspring of unmixed blood; and that, when confined to their own class, mulattoes scarcely reach the fourth generation. In Ripley, Ohio, there has for a long time lived a community of mulattoes, who have always intermarried. The first generation was robust and prosperous; the members of the next generation were paler, more ashy in color, and less healthy; the third union resulted in lessened fertility and greater disposition to disease, the children presenting a scrofulous

physiognomy; the fourth union is still less fertile, brings forth a progeny suffering from a host of scrofulous and tuberculous diseases; scarcely any one of the fourth generation is in good health.

This observation seems to corroborate the statement of many demographers, that a mixed race cannot perpetuate itself without the concurrence of the parent races. Holder²⁰ has made a thorough investigation of the mode of life and hygienic conditions of the Indians supported by the government of the United States, and comes to the conclusion that the great morbidity and mortality observed among them are caused by bad hygienic conditions. Formerly they lived in their "tepees," which were well ventilated, and which were removed to a clean place when the soil had become unclean. The government has built small, badly-ventilated, overheated log-houses, in which the Indians crowd together, and which cannot be removed when the soil becomes saturated with effluvia. Their dress is now neither so warm nor so appropriate to their mode of life, and, finally, their food is far from being good. Formerly they lived on buffaloes killed by the hunters; now they eat slaughtered cattle of bad quality, and often actually suffering from actinomycosis. It is a constant custom for cattle-men driving their herds across Indian reservations to placate the Indians by presenting to them all "big-jawed" steers. It is not civilization, but bad hygienic conditions which are exterminating the Indians.

Parker²¹ has collected information regarding the sexual life of Indian women. The girls begin to menstruate at 14 to 16 years of age. During menstruation they are regarded as unclean, and are obliged to live in small, isolated wigwams. During pregnancy the wife must do her ordinary out-of-door work until delivery occurs, and resume it some hours after labor. Parker has found the mortality of parturient women among the Indian tribes to be less than among white women. In some of the tribes, as the Cheyennes and the Arrapahoes, all grown-up women, married or unmarried, tie their lower limbs with a rope, in such a manner, however, as not to interfere with their power of locomotion. This is done as a protection against the brutality of the men.

Ashmead²² comments on the fact that scarlet fever has never spread in Japan, though it seems to have been introduced there by foreigners. Syphilis, which has been known in Japan since the seventh century, is of a very mild type among the Japanese; but,

if inoculated by them on Europeans, it assumes the most virulent type possible.

Magitot³ describes a singular community of outcasts, the "Cagots," living in the Pyrenees, and regarded as unclean by the rest of the population. They present certain peculiarities, as thickening of the nails, absence of growth of hair on the face, and are regarded by Magitot as descendants of the lepers. The same tribe is represented in the Spanish Pyrenees as the "Agots"; they are called "Gabets" in Guyenne, "Kakous" in Basse-Bretagne. From the discussion, no certain symptoms of leprosy were proven to exist in the Cagots.

MICROSCOPICAL TECHNOLOGY.

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STAINING METHODS.

Tuberculosis Bacillus.—Solles, of Bordeaux, ^{May 11; Aug.} ^{8 100} in a communication to the Société de Biologie, presented a new method for the detection of the bacillus tuberculosis, which can also be utilized in morbid tissues of other kinds,—fibroma, sarcoma, carcinoma, etc.,—in which its presence may be suspected. The tissues are prepared in the usual way for imbedding in celloidin (first in alcohol for a few hours, then in absolute alcohol for a few more, then into ether, and finally into collodion), and sectioned. The sections are stained with the following solution:—

Prussian blue,	.	.	.	.	1 gramme	(15 grains).
Oxalic acid,	.	.	.	.	20 centigrammes	(3 grains).
Distilled water,	.	.	.	.	100 grammes	(8 ounces).

Mix and dissolve. Then dissolve 1 gramme of gelatin in 100 grammes of distilled water, and mix the two solutions.

This liquid will penetrate and stain the anatomical elements, but does not affect the bacillus. These latter are thus remarkably clearly differentiated from surrounding structures.

Another novel method is that described in ⁵⁰ J.A.M.S. A crystal of fuchsin, the size of a millet-seed, is placed in a watch-crystal, with 3 drops of alcohol and 2 or three cubic centimetres of chloroform. The cover-glass, with the coating of sputa on it, is floated upon this clear solution for five or six minutes ; it is then removed and the chloroform allowed to evaporate. The specimen is decolorized with alcohol (96 per cent.) acidulated with three drops of hydrochloric acid. The specimen is then washed and restained in a weak solution of methylene blue. Sections are stained in the same way. The bacteria of milk may be stained by immersing the cover-glass (prepared with a mixture of equal parts of milk

and water) in a mixture of 12 to 15 drops of a saturated solution of methylene blue and 3 or 4 cubic centimetres of chloroform for four to six minutes. On removing the specimen from the bath, the chloroform is allowed to evaporate and the specimen is washed. The bacteria are stained blue.

Influenza Bacillus.—Pfeiffer,²⁰⁰ of the Koch Institute, manipulates the sputum of influenza patients by first sterilizing and cleansing it by Koch's methods, and then treating it with Ziehl's solution or Loeffler's hot methylene blue. The two extremities stain more intensely than the intervening parts, causing some resemblance to diplococci and to streptococci. The bacilli may be then seen under the microscope, being more copious in the mucus and cells of sputum—in the latter, often degenerate. One of their characters is immobility. They are much smaller than any other known micro-organism.

Glanders Bacillus.—E. Noniewicz²⁰¹ advises a combination of Loeffler's and Unna's methods for staining *B. mallei*. The procedure, which is stated to give excellent results, is as follows: The sections are transferred from alcohol to Loeffler's methylene-blue solution (caustic potash, 1-10,000). They are then washed in distilled water and placed in the decolorizing fluid (75 parts $\frac{1}{2}$ -per-cent. acetic acid and 25 parts $\frac{1}{2}$ -per-cent. watery tropaeolin OO). The time for decolorizing depends on the thickness of the sections, the thick ones requiring from two to five seconds, the thin ones much less. The preparations are then thoroughly washed in distilled water; this removes the acetic acid and a good deal of the stain. The sections are then put on a slide, and, the water having been removed with blotting-paper, are dried in the air or over a spirit-lamp. Xylol is then dropped on and allowed to remain till the section is quite clear. They may now be examined or mounted in balsam. Oil of cloves, origanum-oil, and aniline-oil are not to be used. In this way the glanders bacilli are stained almost black, while the tissue is bluish.

Syphilis Bacillus.—Sabourand, of Paris,²⁰² having occasion to test, in fifty-one specimens, Lustgarten's method for the isolation of what the latter considered as the bacillus of syphilis, met with no success whatever. He therefore concludes that it is valueless, and that we are still without reliable means for staining the micro-organism of that disease. He, however, found it extremely use-

ful for the detection of the bacillus tuberculosis when the preparations examined contain very few bacilli, or in specimens from organs composed of dense tissue, such as the liver, in which Ziehl's and other methods give such poor results.

Blood.—M. Mayet¹⁰⁶ considers as quite erroneous the general impression that the majority of white blood-corpuscles are polynucleated. They are, on the contrary, very rarely observed. To ascertain exactly the shape of the nucleus, glacial acetic acid must be intimately mixed with the blood in the proportion of three to one. By this means the red corpuscles are rendered almost invisible, while the extra-nuclear part of the white is more or less dissolved, so that the nuclei are isolated and become very visible. The nucleus then is found to be of a very variable shape, and it is owing to this irregularity that various optical effects are produced, so as to give the appearance of more than one nucleus. The nucleoli are always multiple, there being one for each swelling of the nucleus. When a white corpuscle is really polynucleated, it is just in the act of division, nucleus and extra-nuclear plasma as well; but this condition is rare.

T. N. Kelynack⁹⁰ reviews R. Muir's²⁷⁷ method of examining blood, which is thought to overcome certain disadvantages in the Ehrlich and Flemming methods. Films of blood are formed on cover-glasses, all pressure on the films being avoided. They are then placed at once, before any drying occurs, with film surface downward, on the surface of a saturated solution of corrosive sublimate, with $\frac{1}{4}$ -per-cent. sodium chloride added, kept at a temperature of about 50° C. (122° F.),—this latter is not essential,—and allowed to remain for about half an hour. They are then washed in “normal saline” solution, and passed through successive strengths of alcohol, and then stained in the same way as sections. Salt ($\frac{1}{4}$ per cent.) may also be added to the weaker strengths of alcohol. The most useful stains are Ehrlich's acid haematoxylin with aurantia or with eosin, safranin with aurantia, the triple stain of safranin, haematoxylin and aurantia, and Biondi's triple stain. Bone-marrow, spleen-pulp, juice of lymphatic glands or from tumors, etc., can be treated in the same way, care being taken not to distort cells by crushing or in spreading out.

Hénocque, of Paris,⁴⁹⁹ has recently perfected a new form of haematoscope, by means of which he is able to measure with great

exactness the amount of oxyhaemoglobin in the blood, when the quantity contained is greater than 0.000,000,81.

Trichina.—W. N. Preston²⁰⁰ suggests the following method for mounting trichinous muscle: "Macerate a small piece of the muscle in cold water for a day, then tease it out with needles and place between two slides and bind with stout thread; immerse in alcohol (about 95 per cent.) for about ten minutes, then separate slides and transfer muscle to oil of cajeput; let it stand here for two or three days, and mount in balsam. The trichinæ will not 'disappear,' nor will they shrink, as I have had them do in time after having used the alcohol solution for a longer time."

Pathogenic Fungus of Malaria.—J. Fenton Evans²⁰¹ has found it possible to stain the organisms of malaria with an anilinized alkalized solution of rosanilin hydrochloride after treatment with bichromate of potash, and after treatment with dilute sulphuric acid by an anilinized alkalized solution of Weigert's acid fuchsin. Another method is the saturation of the tissue with a copper salt, and its reduction by sulphuretted hydrogen previous to coloration with anilinized alkalized acid fuchsin. Grassi and Feletti²⁰² recommend the following method: A slide, over which a very thin layer of malarious blood has been spread and allowed to dry, is dipped in a mixture of equal parts of alcohol and ether, into which have been placed a very small quantity of acetic acid in crystals. It is then colored with haematoxylin. When fresh blood is to be examined, a drop is placed on one slide and a drop of diluted methylene blue on another, and the two slides are juxtaposed and their liquids thus brought together and mixed. The slides are then separated, leaving a thin film on each one. The parasite will be less colored than the globule containing it.

Animal Cells.—In an able review of the subject of reproduction of the animal cell, Van Hook and Oldmacher, of Chicago,²⁰³ allude to several novel practical points in connection with their cytological study of cells. Equal parts of alcohol, glycerin, and water are superior to plain alcohol, for purposes of preservation, according to Flemming.²⁰⁴ Frenzel²⁰⁵ employs as a fixing solution corrosive sublimate in 70- to 80- per-cent. alcohol, acidulated with nitric acid (1 drop to 2 cubic centimetres). He also employs Merkel's solution, which consists of equal parts of a 1-400 solution of chromic acid and a 1-400 solution of platinum chloride. Her-

mann²⁹ also employs for fixing a mixture of platinum chloride with osmic and acetic acid. His work is particularly important because he has devised a method of differentiating the various phases of the karyokinetic process without the use of special dyes for staining. After fixing in the platinum chloride-osmic-acetic acid mixture, he washes in running water and hardens in alcohol; then he lays his objects in undiluted pyroligneous acid for twelve to eighteen hours. This reduces the osmium and stains the chromatic element dark brown, while the protoplasm is stained a distinct grayish green. He imbeds in paraffin, and cuts the sections very thin. Van Hook and Oldmacher close their review by describing Flemming's triple stain²⁹ which, he claims, will demonstrate by staining reactions the chromatic and achromatic elements of the nucleus, and the centrosomes or "attraction spheres." He fixes his tissue (from the epithelium of the growing lung, endothelium and connective tissue of parietal peritoneum, and mesentery of the Salamander larva) in his chromo-aceto-osmic acid mixture, allowing the objects to remain in the fixing solution for weeks, or even months in some cases. The sections are first stained in safranin for two or three days, the solution employed being after Flemming's old formula, which consists of a concentrated solution of safranin in absolute alcohol, diluted with one-half of distilled water. Wash in distilled water, then in absolute alcohol, to which a little (not more than 1-1000) hydrochloric acid is added. Very thin sections are preferably washed in pure neutral alcohol. After another brief washing in distilled water, the section is carried to a gentian-violet solution (a dark, aqueous solution) to remain one or two hours. Then wash again in water and bring to a concentrated aqueous solution of orange (Orange G. of Grübler), in which the previous color is partially removed. After a few minutes, or with very thin sections even sooner, remove the section to absolute alcohol while the blue clouds of gentian violet are still being given off; here a mixed yellowish and violet color is discharged, followed by pure violet. As soon as the violet clouds begin to discharge in the absolute alcohol, the section is removed to another vessel of pure absolute alcohol, and, after a short washing, to clove-oil or bergamot-oil. Here the violet color still comes away, and before this process is complete the section should be mounted in dammar balsam. Flemming adds a few drops of aniline-water to the safranin solution,

enough to make the mixture smell perceptibly of the aniline. It is needless to point out that an object may be carried through the various steps of the general method, the sections fixed on the slide, and the different steps of Flemming's triple-staining process be conducted in the same manner as described under staining with safranin or gentian-violet in this article.

Dentine.—J. H. Mummery⁹⁹ used, besides the usual processes, the method employed by Weil, which consists, first, in fixing the soft parts by placing the freshly-extracted tooth, after dividing it at one end, in a saturated solution of corrosive sublimate in water. When sufficiently fixed, the sublimate is removed by washing, and the tooth passed through successive grades to absolute alcohol; then passed into chloroform, to which are gradually added fragments of desiccated Canada balsam until a very thick solution of the balsam is produced. The preparation is now placed in a suitable receptacle over a water-bath, covered with more of the desiccated Canada balsam, and kept at a temperature of 90° C. (194° F.) for several days, to allow a thorough penetration of the tissues with the hardened balsam. The tooth is cut with a sharp saw under water, and the sections ground down, first on a lathe with corundum and afterward with a fine stone with water, under the finger. Staining in bulk may be accomplished during the treatment with alcohol, and the sections are mounted in chloroform balsam.

Nerves.—C. Weigert, of Frankfort-on-the-Main, ^{69, 1006} reviews the history of the method bearing his name. As the result of further experiments he proposes certain modifications which render differentiation unnecessary in loose sections. The method, as now revised, consists of four stages, as follow: (1) hardening in chromic salts; (2) introduction of copper in the chromium compound within the sheaths; (3) staining with hæmatoxylin; (4) differentiation by means of borax-ferricyanide of potassium. The precipitate which tends to appear during the staining is prevented by the addition of the carbonate of lithium.

Fragments suitable for microscopic sections are thoroughly hardened in bichromate of potassium, and, after treatment with alcohol, are imbedded in celloidin. After coagulation in 80-percent. alcohol they were, according to the old method, brought into a solution of neutral cupric acetate in an equal volume of water and kept in the brood-oven twenty-four hours. The modification

consists in the substitution of equal volumes of neutral cupric acetate and tartrate of soda. Large fragments may remain for forty-eight hours without injury, provided the temperature be not permitted to rise too high. The fragment then is passed into an aqueous solution of cupric acetate, and remains twenty-four hours longer in the warm chamber. After rinsing, the specimens go into 80-per-cent. alcohol, where they become available for sectioning any time after an hour or so.

For staining, two stock solutions are required: (A) 7 cubic centimetres saturated aqueous solution of carbonate of lithium + 93 cubic centimetres distilled water; (B) 1 gramme haematoxylin + 10 cubic centimetres alcohol. These are to be combined just before using, in the proportion of 9 volumes of A to 1 volume of B. Sections stain in three or four hours, though the staining is not injured by leaving them twenty-four hours in the fluid. This process is, unfortunately, only available for free sections, which then require no development, but, after rinsing, are brought into 90-per-cent. alcohol and are cleared in a mixture of 2 volumes of aniline-oil + 1 volume of xylol, followed by pure xylol and balsam.

Valuable collective reviews of Golgi's method of silver-chrome impregnation were published by H. J. Berkley, of Baltimore⁷⁶⁴_{Mar.}; A. Pilliet, of Paris, ¹⁶⁴_{Mar., 10, 17, 24}, and by an editorial writer.^{764 1008}_{Mar., May} E. T. Wynne, of Rainhill, Eng., ⁶_{Sept., 24} recommends permanganate of potassium as a fixing reagent in the place of osmic acid for preparing fresh sections of the nervous system, having found it more trustworthy and expeditious. The steps in the process are the following: The sections are cut with a Cathcart or some similar microtome, and each, as it is cut, is plunged (on the knife) into a 0.1-per-cent. solution of permanganate. The section must not remain more than ten seconds in the solution (four to five seconds is plenty for normal brain), but be taken out on a glass lifter and transferred to a basin of clean *cold* water. The sections will be found slightly tinged yellow. This comes out in the process of washing and staining. The sections, which have been accumulating in the basin of water, are now put into a 0.25-per-cent. solution of blue-black (or a 0.1-per-cent. solution of China blue), where they remain from ten to fifteen minutes. A large quantity of stain should be used and care taken that the sections are

freely exposed to the dye. When stained, they must be well washed in water, picked up on slides, and allowed to dry. The best results are obtained by allowing them to dry slowly over night, but with care they may be dried in about an hour in a warm chamber. There are three points of importance, viz.: to see that the water and permanganate solution are *cold*, to wipe the under surface of the knife-blade after cutting each section, and not to freeze the tissue hard; it should cut like a potato. The author uses a deep quarter-plate developing-dish for his permanganate solution. In it the knife can be readily submerged without wetting the handle and without having an inconvenient depth of fluid.

Konrad Alt, of Halle,³⁴ to color nerve-fibres, places the hardened sections in an alcoholic solution of Congo red at ordinary temperature, or, better still, at a temperature of 35° C. (95° F.). They are left there from three-quarters of an hour to two hours, then dipped in 96-per-cent. alcohol first, afterward in absolute alcohol. The preparations are then mounted in essence of bergamot and Canada balsam. The same method can be utilized for muscular tissue. Rehm³⁴ describes a new method of staining preparations of the central nervous system, which is, properly speaking, a modification of Nissl's method. The sections, hardened in alcohol, are placed in a warm 1-per-cent. solution of methylene blue, where they are allowed to remain half a minute. They are decolorized by 96-per-cent. alcohol, and stained by a 1-per-cent. solution of fuchsin for from one-quarter to half an hour; again decolorized by alcohol, made transparent by essence of cloves, and mounted in Canada balsam. In well-prepared sections the nerve-cells are stained blue or bluish red, the nuclei of the connective cells and the vessels a clear light red.

Redlich, of Vienna,⁶⁸ employs Marchi's method of staining for fresh specimens, and occasionally for older ones. He was, by means of this method, able to see very distinctly the ascending degeneration of the posterior columns in a case of compression of the spinal cord, as well as in analogous cases. In ordinary cases, he does not consider his method more than an auxiliary to those usually employed, but in more complicated cases important peculiarities in the pathological process may be brought out by its use.

Teichmann⁸ describes his method of preserving the brain by alcohol and essence of turpentine. Having removed the brain, he

places it in 60-per-cent. alcohol; two or three days later, in 95-per-cent. alcohol, changing the alcoholic solution from time to time until the alcoholometer marks from 85 to 95 per cent. The dehydration of the brain requires several weeks, following which it is placed in essence of turpentine, where it is kept at a temperature of 30° to 40° R. (99.5° to 122° F.).

Eosinophilous Cells. — Bergonzini⁶¹⁵ employed the Erhlich-Bondi stain in modified proportions. By this stain, the eosinophilous cells were distinguished by their granulations coloring red, the leucocytes coloring green, of a more or less deep shade. The author has met with these cells not only in pathological conditions (anaemia, leukæmia, scorbatus, typhoid fever), but also in normal tissues, as, for instance, in the mesentery of the frog and in various organs of the white mouse. In man they are rarely found in a good state of preservation, though they are more frequent in tumors. Their origin is in the bony marrow, and their presence indicates an alteration in nutrition.

HARDENING, IMBEDDING, AND MOUNTING AGENTS; INSTRUMENTS.

Hardening.—A. G. Auld²¹⁸ described Fol's fluid for rapid hardening, of which the following is the composition:—

Saturated aqueous solution picric acid,	10 parts.
One-per-cent. chromic acid,	25 "
Water,	65 "

Tissues prepared by it can be examined in from twelve to twenty-four hours. The fresh tissue is cut into very small pieces and placed in the fluid. When removed, it is cut by the freezing microtome without any further preparation. The resulting sections are already stained by the picric acid, and in many cases no further staining is required. Further staining, however, may be made with alum-carmine or haematoxylin. The tissue should not be left more than twenty-four hours in this fluid, or it will become too brittle.

Imbedding.—As an imbedding agent in the preparation of objects for section-cutting, Glynn¹⁸⁷ considered celloidin particularly useful in the case of the nerves and the spinal cord. He directed attention to several causes of failure in the application of the process. Specimens to be cut should be immersed for a long period in the ethereal solution of celloidin, or they will not acquire sufficient firmness. They should be left in the weak solu-

tion of celloidin for a month at least before removal to the stronger solution. Subsequently they should be left for many days in methylated spirit. To obtain sections of sufficient thinness the knife of the sliding microtome should be placed as obliquely as possible, and smeared with vaselin as well as flooded with spirit. In staining, care should be taken to use dyes that may readily be discharged from the celloidin, or that will not color the celloidin. The specimens Glynn exhibited were stained either according to the Weigert method or with the ordinary hæmatoxylin fluid; in the latter case the excess of dye was removed by acetic acid in the usual way.

He found a mixture of oil of cloves, 1 part, and oil of white thyme, 4 parts, to be the most useful clearing-agent. In using it, however, it must be remembered that the mixture is volatile, and that if sections be left unwatched, even for a quarter of an hour, they will become dry and be spoiled. Absolute alcohol, as it dissolves the celloidin, cannot be used to dehydrate specimens, and, not being completely dehydrated, the preparations clear slowly; it is better, therefore, to immerse the sections in the mixture of oil of thyme, or to introduce the oil under the cover-glass.

A. J. Smith⁴⁵¹ reviews an article by Kühne, of Wiesbaden,⁵⁰ who, after commenting upon the fact that in using the freezing microtome, if the tissue be frozen completely, the knife is very apt to ride over it and cut a section of uneven thickness, and that when the freezing is of the degree most favorable for cutting the tissue is apt to become separated from the freezing-plate, suggests that this difficulty may be obviated by substituting anise-oil for water, the former becoming solid at from 6° to 18° R. (45.5° to 72.5° F.). In course of time, from exposure to the oxygen of the atmosphere, lower temperatures may be required to solidify the oil, but when it is fresh and pure it congeals almost at the ordinary temperature of the room. A small bit of the tissue, about an eighth or twelfth of an inch in thickness, is placed in the oil after careful hardening in alcohol. In about twelve or twenty-four hours it is thoroughly impregnated with the oil, the clearness of the specimen being regarded as the test. The plate of the microtome is carefully cleaned and wiped off with a rag wet with alcohol, and dried; a few drops of the oil are placed upon it, and upon this the bit of tissue to be frozen. A few pumps upon the

ether-spray apparatus suffice to solidify the mass, and sections may be made. From the knife the frozen sections should be placed in a dish containing alcohol to remove the oil, care being taken to prevent contact of alcohol with the imbedded mass on the microtome, as it would thus be dissolved and the tissue loosened from the freezing-plate. The further preparation of the specimen rests with the operator, excellent results in staining of both tissues and bacteria being possible with ordinary care.

Mounting.—A. M. Edwards, of Newark,¹⁰⁶ contributed a medium for microscopical objects, both animal and vegetable, which possesses the property of not being liable to mold, and also possesses a high refractive index. He describes its preparation as follows:—

“ A slide is used three inches long and one inch broad. This is the ordinary slide now recognized on the Continent and in America, but originated first at the Royal Microscopical Society of London. On this a cell of English gold-size is turned with a Shadbolt's turn-table, or some of the numerous modifications. The cell is big enough to take in the cover used; that is to say, it is not too large or too small. The cell is made with one or more coats of English gold-size and put aside to harden, which it will in a day or so. When used, another coating of English gold-size is put upon it and the object is placed in it. In this is placed a drop or two of the medium, which I make as follows: A saturated solution in the cold, of borax, has added to it a quantity of true salicylic acid. I use the true salicylic acid alone, for that is salicylic, and that made from carbolic acid, although ranked as salicylic, is not the true acid. Into this solution I place a quantity of oil of cinnamon, and we have a saturated solution of borax, salicylic acid, and oil of cinnamon. This is filtered. On this, in the cell, I use a cover not too thin, though thinner covers can be used. I absorb the solution that flows out on pressing it down on the cell with filter-paper, and finish it off with two or three coats of English gold-size. It will keep forever,—that is to say, as long as the slide is made tight. The medium kills bacteria and molds generally, and kills and arrests the motion without changing, to any great extent, the cell-contents of diatoms and confervæ.”

Haly,²⁰⁰ curator of the Colombo Museum, Island of Ceylon, used carbolic acid, cocoanut-oil, and turpentine, which readily mix together, to form a fluid in which objects may be allowed to soak

without any previous preparation, and in which they become very transparent. He kept the leg of a fly on a slide in a drop of this fluid for ten months without alteration. No cell was made, no cement employed, and an ordinary cover-glass was simply laid over the object. A more extensive use of cocoanut-oil and carbolic acid was made for a preservative fluid, and it was found to preserve the colors of various animals, including the most changeable colors of fishes, frogs, and snakes, in a very satisfactory manner. The mixture used for that purpose consisted of cocoanut-oil raised to the specific gravity of 10 degrees, or of 20 degrees below proof-spirit, by the addition of carbolic acid.

INSTRUMENTS.

The instruments meriting special attention described during the year are the following: An apparatus to take the place of the camera lucida in micrography, an adaptation of the principles employed in ordinary projection as used in connection with the optical lantern, the projection microscope, etc.; also an improved means of obtaining critical illumination for the microscope in which an incandescent lamp is used having a short and thick filament of fifteen candle-power, requiring a current of about three ampères under a pressure of fifteen volts,—both inventions of H. G. Piffard, of New York ^{1,14}; a drawing apparatus for low magnification, also based on the projection principle, by means of which the outlines of a drawing can be accurately made, the details to be subsequently filled in from the microscope,—devised by L. Edinger, of Frankfort-on-the-Main, and described by Joseph Collins, of New York ^{1,15}; an apparatus bringing into action centrifugal force for the purpose of causing instantaneous precipitation at its distal ends of all sediments or morphological constituents of liquids placed in it,—devised by Thor Stenbeck, of Sweden, and described by A. Abrams, of San Francisco ^{1,17}; an apparatus involving the same principles, for the same purposes, so disposed mechanically as to enable it to be rotated in the same manner as a top,—invented by G. Gaertner, of Vienna ^{1,18}; a rotating mica-plate that can be used in all examinations where polarized light is employed,—devised by W. Lighton ^{1,19}; a freezing combination-microtome, adapted to three methods of section-cutting,—invented by Thomas Taylor, of Washington, D. C. ^{2,20}; and a “cheap and efficient microtome,”—devised by A. F. Hinz, of Carleton, Neb. ^{1,21}

HISTOLOGY.

By CHARLES E. SAJOUS, M.D.,
PARIS.

Nervous System.—According to Weigert,¹⁰⁰⁶ the neuroglia fibres form a dense reticulum upon the surface of the central nervous system. In the cerebrum the reticulum is present in the white matter and superficial layer, while the deeper parts of the cortex are comparatively poor in neuroglia fibres.

Lachi states that in the chick up to the eighth or ninth day there is an ectodermal neuroglia (of spongioblast origin), but mesodermal elements then appear, forming the pia and sinking into the white substance. These gradually reproduce and take the place of the spongioblasts. After birth, leucocytes and endothelium cells are superadded. Staderini states that the granular substance found by Thompson at the exit of various cerebral nerves, and which Thompson regarded as degenerate nerve-cells, is easily recognized in the third, fourth, sixth, seventh, and tenth nerves, but really consists of projections of the central neuroglia, with which it retains connection.

Berkley⁵⁰ distinguishes three systems of medullary cortical fibres staining by osmium, copper, and haematoxylin. These systems are : (1) radial, (2) intercellular, (3) peripheral. The first leave the subcortical body, forming vertical bands which traverse the cortical layer at regular intervals. The intercellular fibres show three varieties : one very large and dark ; another of varying size, having numerous branches ; and another very fine, having numerous ramifications, with some varicosities. The peripheral system contains fibres running in two directions, transverse and longitudinal.

Berdez¹⁰⁷ made use of the method of Marchi and Algeri in studying the origin of the fibres of the posterior column of the spinal cord, the process of secondary degeneration following section of the posterior roots in the guinea-pig, and for the study of this degeneration. Allowing the specimen to remain in Müller's fluid

at least eight days, he placed it for from five to twelve days in a solution composed of two parts of Müller's fluid and one part of osmic-acid solution (18 per cent.). The author found, contrary to Rosso-limo, that the long fibres of the columns of Goll are for a great part a direct continuation of the posterior radicular fibres. A number of these fibres leave the posterior column on reaching the medulla, but some ascend as far as its bulbar nucleus. The internal portion of the cord is not entirely formed of fibres of radicular origin; some may be supposed to come from the gray substance. Ascending degeneration affects the two antero-lateral columns, first opposite the gray substance, and higher at the periphery of the posterior column. The greater number of degenerated fibres are found at the level of the cerebellar fasciculi, as in the degeneration pointed out by Löwenthal in the direct cerebellar column following section of the posterior roots. The course of these fibres is still unknown. The researches of the author confirm the theory advanced by Oddi and Rossi, that ascending degeneration after section of the posterior roots is bilateral, although sometimes more pronounced on the side of the lesion; it tends toward the postero-internal portion of the column. They also confirm the existence of descending fibres, as noticed by Kölliker and Ramon y Cajal in the posterior column.

Marini⁴⁸⁴ employed the method of Weigert-Pal, with a modification of his own, in studying the ependymal filaments of the bulb in man. He had already⁴⁸⁴ insisted upon the importance of these filaments. His specimens were taken from the floor of the fourth ventricle. The epithelial filaments, united and in a distinct bundle, were directed toward the median raphé, where they were united to the right fibres, without permitting the discovery of their ulterior course, which was perhaps toward the internal olfactory body. In other preparations of the brain (hemispheres, optic lobes, bulb, etc.) of the frog, filaments sufficiently abundant could be seen emanating from the epithelium of the lateral ventricles, taking a course toward the superficial layer and forming a rich net-work. If the median bundle of epithelial filaments of the bulb in man were in relation with the nucleus denticulatus of the cerebellum (not an improbable thing), it might contribute to the equilibrium of the body in transmitting variations of pressure of the cephalo-rachidian liquid. This simple hypothesis may be strengthened by the observation of the author

that, in subjects affected with tabes dorsalis in an advanced stage, the bulbo-spinal epithelium was destroyed or profoundly altered.

Dogiel, of Tomsk, Russia,²⁹ in an article upon the nervous elements in the human retina, distinguishes three layers: external, middle, and internal. The internal layer is composed of pigment epithelium and neuro-epithelium (bipolar cells). The middle layer is made up of two parts, inner and outer, the inner being formed by the middle and internal gangliar layer and of the layer of nervous fibre, the outer by the nervous tubo-epithelial, multipolar, and bipolar cells. Finally, the internal layer is formed by the internal lining membrane.

Teeth.—Röse, of Berlin,³⁰ discusses the development of the teeth in man. The first trace of teeth is found in the embryo of from thirty-four to forty days, in the form of round cells, non-differentiated. In the embryo of seventeen millimetres the primitive layer separates into two parts, of which the superior is the true dental layer. This forms into eminences which are the foundation of milk-teeth. Toward the tenth week the protuberances begin to be covered laterally, in the depth of which the dental layer is developed. By the seventeenth week the dental layer shows an irregular excrescence, with partial perforation in the region of the incisors, the milk-teeth being in front of these eminences, but not perforated. At the moment of birth the dental deposit behind the milk-teeth is united with the dental layer on a level with the first molar by a comparatively broad bridge. Later this layer is developed posteriorly, and in a child of 3 years the same condition of the second molar is found as in the newborn for the first molar. The subsequent development takes place in the same manner,—that is, by lateral penetration in the dental layer.

Skin.—J. Halpert^{520, 51, vi} states that two theories exist upon the formation of pigment in the epidermis. According to the first, it is formed locally by a metabolic action of the cells of the epidermis; according to the second, it is transported by the blood-stream from deep to superficial portions of the skin. The author studied the skin of the negro and the white man, and observed the first pigment-cells in the neighborhood of the sebaceous glands, and chiefly in the vascular net-work, where it appeared in the form of small, yellowish grains. The quantity of the grains gradually increased toward the superficial part of the skin, finally covering the outline

of the cells within which it was disposed, the nucleus being free. The pigment-cells were entirely normal in the portions of medium and great depth, but in the superficial portions of the skin, under the epidermis, there were sometimes observed appendices which exceeded in length the cell itself, sometimes reaching the inferior layer of the skin and penetrating the fourth or fifth row of the Malpighian layer. These appendices showed the origin of the pigment to be in this layer, the pigment-cells having here a sickle-shaped appearance. In the superficial layer the pigment was found in other forms. In the white skin the relations were found to be the same, but the quantity of pigment was less. The pigment-cells were larger than the others. The author thinks that the pigment of the epidermis occurs, properly speaking, by the aid (1) of the appendices of the pigment-cells; (2) of the migratory cells of the skin, which in the deep portion of the rete Malpighii take the form of scythes or sickles. These latter become separated into minute parts, and give origin to the pigment of the rete, or, in larger particles, absorbed in the cells of the Malpighian layer, form there round bodies with a large amount of pigment.

Schwalbe²⁰⁰, gives the results of his researches upon the pigmentation of the skin in men and mammals. Having four ermines at his disposal, he was able to study the changes in the coloring of their fur. Microscopical examination showed that the horny layer and the entire epidermis were devoid of pigment, the pigment-cells being found exclusively in the epithelial matrices and the hair-bulbs.

Basing himself upon the theory that microbes of quite a number of diseases are eliminated in sweating, and that in several diseases this is the chief means by which the system rids itself of these organisms, Brunner²⁰⁰ sterilized the skin of animals and then produced in them anthrax, micrococcus prodigiosus, and staphylococcus aureus. In each case he found the microbes in both sweat and saliva. It follows that if such infected sweat is not washed off promptly the microbes are liable to be re-absorbed; hence a new and urgent reason for cleanliness and for a frequent change and disinfection of garments in case of infectious diseases.

Connective Tissue.—Grawitz,²⁰¹ in studying the structure of connective tissue, and its importance in inflammation, concludes that the principal rôle in inflammatory processes is played by

special cells, distinguished, by their fusiform appearance, from the embryonic cells of connective tissue. These cells also take part in the formation of neoplasms.

Elastic Tissue.—Heller¹¹⁶ gives the following conclusions on the histogenesis of the elastic fibres of the reticular cartilage, and the posterior ligament of the nape of the neck: 1. The reticular cartilage of the auditory canal must be distinguished, from a histological and histogenetic stand-point, from that of the larynx. 2. Elastic tissue appears first in the form of fibres, which later become granulous. 3. Elastic fibres are formed in the ear by intercellular substance; in the larynx and posterior ligament, by cells.

Spermine.—Guttmann, of Berlin,¹¹⁷ showed a preparation of crystals of phosphate of spermine, sent him by Pöhl, of St. Petersburg, who considered them identical in form with Böttcher-Charcot-Leyden crystals. Guttmann observed, however, that these spermine crystals had a rounded form, while the others are angular.

Cardiac Cells.—Solger¹¹⁸ found, in the heart of a pig about 1 year old, two different classes of cells. The first was composed of short rows, containing from three to ten cells, which multiplied by mitosis, while the second class multiplied by amitosis. The former developed into adult tissue, while the latter explained, probably, the death of muscular fibre.

Retinal Pigment-Cells.—J. S. Boden and F. C. Sprawson¹¹⁹ have examined the eyes of various animals to show that the pigment-cells are not always hexagonal, as is generally supposed. The eyes taken were from the sheep, ox, rabbit, kitten, pig, frog, and hen. The method of preparation was as follows: The eye being removed, an incision was made into the sclerotic, and it was placed in Müller's fluid for a few days, then transferred to a very dilute Müller's fluid for a day or two, in order to macerate it a little, and the eyeball freely opened; the black pigment-layer can be stripped off fairly easily. Portions of this were mounted in glycerin or Farrant's solution, and examined unstained. In some cases the specimens were stained with dilute magenta.

Lympho-Stomata.—Schlesinger, of Vienna,²² drew attention to the thick net-work of lymphatic vessels in the central tendon of the diaphragm which communicate freely with the abdomen, as pointed out by Klein and Votkin. If the living diaphragm be colored with nitrate of silver, and examined with a glass of a few

diameters, well-defined openings in the endothelium, in the immediate neighborhood of the lymph-vessel, can be observed. By lowering the micrometer, these openings can be traced into the vessels clothed with a fine endothelium. In connection with these openings, there are also to be found fine oblique canals directly communicating with the vessels. The number and size of these stomata clearly explain how rapidly fluid from the abdominal cavity can be absorbed.

BACTERIOLOGY.

By HAROLD C. ERNST, A.M., M.D.,
AND
HENRY JACKSON, M.D.,
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Agar-Agar.—Schutz⁷⁶⁴ describes a new rapid method of making agar-agar. The special point seems to be the vigorous boiling of the water and agar in an open vessel for thirty minutes, and the removing of the thick white scum that appears floating on the surface during this process.

Acid Media.—Schluter⁵⁰ states that many bacteria grow, some of them very well, upon distinctly acid media.

Amœba Coli.—Stengel¹¹² comes to the following conclusion in regard to the amœba coli: That in this amœba of Lösch we



CHANGE OF SHAPE AND PRODUCTION OF PSEUDOPODIA IN AMOEBOIC DYSENTERY.
(University Medical Magazine.)

have a constant associate of dysentery; that there is much reason to believe that it bears an etiological relationship to the disease, though apparently the accurate observations of Cunningham and others leave much doubt upon the subject. It seems certain that post-dysenteric abscesses result from the action of micro-organisms conveyed to the liver by the amœbæ, and that the organism itself may play some part in the tissue destruction. The figure represents the changes in an amoeba found in the stools of a case of dysentery of our endemic type. The changes of shape and the

production of pseudopodia are represented, as well as the massing and flowing of the granular matter spoken of in his article.

Anthrax.—Segal⁵⁰ has an article upon the alterations in the animal organism under the influence of attenuated anthrax cultures. In rabbits a very great difference was noticed between the local reaction at the point of inoculation following the introduction of bacteria possessed of their full virulence, and of those that had been deprived, either in full or in part, of this property. This difference, which consisted of a local collection of leucocytes, was inversely proportionate to the degree of virulence of the bacteria employed, for virulent cultures produced an insignificant local collection of leucocytes, whilst attenuated organisms produced a more or less intense local reaction, consisting of dilatation of the vessels, immigration of the leucocytes, and swelling of the subcutaneous tissues. Phisalix⁵⁵ gives the details of the experimental regeneration of the spore-producing properties of the anthrax bacillus, which had been deprived of this power previously by the subjection to heat. Czaplewski⁵⁶ continues his work upon the production of immunity in birds against anthrax, by the record of a very large series of experiments. The results, as far as the production of immunity is concerned, are discouraging.

Auto-Intoxication.—Albertoni⁵⁹ concludes as follows in regard to the question of auto-intoxication: 1. The condition is brought about either by the retention in the organism of substances normally found, but destined for excretion, or by formation either of new substances or of unusual quantities of the normal ones in the body. 2. Putrefactive bacteria in the intestines, by their action on food, form large quantities of poisons. This process, while limited, cannot be considered as pathological, but in indigestion there are formed excessive quantities of aromatic, albuminoid, and nitrogenous bodies, besides fatty acids. 3. The substances known to play a part in auto-intoxication are peptotoxin; leucomaines and ptomaines; aromatic bodies, such as sudol, etc.; volatile fatty acids, ammonia, methane, sulphuretted hydrogen, acetone, etc. Many of these are constantly formed during health, but in small quantity only. 4. The most efficient agencies against excess of these are the presence of hydrochloric acid in the digestive tract, with other acids and glucose, and oxygenation of the tissues, by which many of these products are destroyed. 5. Disorders of digestion,

anæmia, and other cases of enfeebled nutrition may thus, as well as disorders of the excretory organs, be indirect causes of auto-intoxication. 6. Fatigue, fasting, etc., produce diminished intestinal tonus, which, by allowing undue fermentation of the retained dejecta, may produce similar effects. 7. Pathogenic microbes may, by the products of their growth in the body, produce auto-intoxication in another sense. 8. Discovery in the excreta of such unusual constituents as combined sulpho-acids, phenol, acetone, peptones, etc., should at once lead to the suspicion of auto-intoxication in doubtful cases. 9. From the toxicity of the fluid excreta itself little can be argued, as even normal fluid excreta may possess toxic properties. 10. The best-understood forms of auto-intoxication are, perhaps, those caused by acids, aromatic substances (neuro-paralyzants), diamines, and those due to acetonæmia. As to the presence of acetone, however, this seems far more important, as indicating the existence of auto-intoxication, than as a demonstration of the poisonous properties of acetone itself. 11. The two most fruitful lines of research, as to the nature of auto-intoxication, are probably the relation of this condition to the state of oxidation of the tissues and the intimate action of various toxins on the body.

Pathogenic Bacteria.—Esmarch,⁵⁸ has made a series of experiments to determine what becomes of pathogenic bacteria in the dead body. The investigations were upon mice, guinea-pigs, and rabbits, which suffered from septicæmia, anthrax, cholera, malignant œdema, tuberculosis, tetanus, and typhoid. The cadavers were either buried in the ground or preserved in air or water. The pathogenic bacteria were destroyed, in every instance, within a longer or shorter time. Their destruction was specially rapid where decomposition had taken place. Pathogenic bacteria may be destroyed, however, without the agency of the bacteria of decomposition, probably by reason of the lack of oxygen.

The Blood.—Paul⁴¹ has made certain studies upon the bacteria-destroying power of the blood. He comes to the following conclusions: 1. The organism of the rabbit has a strong bacteria-destroying action against anthrax. This property is greater under the skin than in the blood. 2. The blood-serum of rabbits has a strong bactericidal property out of the vessels as well as in. 3. Dogs and pigeons have no absolute immunity against anthrax. 4. The blood-serum of rabbits and pigeons has no bactericidal power.

5. The blood-serum of rabbits and pigeons injected under the skin produces immunity in guinea-pigs against anthrax. 6. The bactericidal power of the blood-serum of rabbits depends upon its alkalization.

Parasites of the Blood.—Celli and Marchiasava⁴⁵¹ give a general review of the subject of the parasites of the red blood-corpuscles. They believe that the parasites of the red blood-corpuscles of man, birds, and cold-blooded animals, although belonging to the same general sub-class, are still by no means identical.

Butyric Acid.—Botkin⁵⁸ describes an anaërobic bacillus that he found in milk, to which he ascribes the true characteristics of a butyric-acid bacillus. It produced a souring of the milk very quickly, with free production of butyric acid, and behaved in a similar manner in sugar and other strong solutions. The bacillus is shown in the annexed plate.

Carcinoma.—Dumaine,⁸ in speaking of the various work upon the coccidia of cancer, says that the observers have wrongly considered as parasites the intercellular alterations of epithelial tissues. If instead of artificially building up a series of forms of the pseudococcidia the phases of transition between these forms and the epithelial cells had been represented, it would have been recognized that these transitions did not allow of the supposition of their being any new growth such as coccidia. The psorosperms observed among the vertebrates have never yet produced any new growths.

Ruffer,² furnishes a preliminary note on certain parasitic protozoa found in cancerous tumors, to which, possibly, the same objection as in the preceding note may be applied.

Cholera.—Doyon⁴⁵⁷ gives the results of his experiments on the influence of desiccation on the bacillus of cholera. It is generally admitted that desiccation rapidly destroys the vitality of this organism, but, if one desiccates a culture in the exsiccator with sulphuric acid, the vitality is preserved for a very long time. In this dry medium the oxygen of the air cannot act upon the bacilli and bring on progressive combustion. The culture resists, also, in these conditions, the bactericidal influence of sulphurous vapors, of carbonic acid, of the essences of mustard, and of oil. It is easy to demonstrate that these same agents, with the presence of moist-

ure, produce a rapid destruction of this organism, and, as a consequence, therefore, desiccation can only be considered not as an agent of destruction, but as a means for the preservation of the bacilli.

In ²⁰⁰ there is given a notice of the work of Hashimoto on the influence of vinegar upon cholera bacilli, in which he finds that the bacilli cannot live long in vinegar, but lose their vitality in less than fifteen minutes. Although the vinegar may be loaded with the virus, it can be used without fear of infection after fifteen minutes have passed. The vinegar experimented with contained 2.2 per cent. and 3.2 per cent. of acetic acid.

Vincenzi, ²⁰¹, in a little note upon certain researches on cholera cultures, states that: 1. One drop of a bouillon cholera culture, injected subcutaneously, produces an enormous oedema in guinea-pigs and death of the animal in from ten to twenty hours. 2. The same result is to be obtained by an injection in the abdominal cavity or the pleural sack. 3. The blood, as well as the intestines, of animals so treated always contains living cholera spirilla. 4. The infection only takes place through the intestinal canal when the intestine is mechanically or carefully controlled. 5. In parts it behaves as does the vibrio of Metschnikoff. 6. The blood-serum of normal guinea-pigs has no influence upon virulent cholera spirilla. 7. Animals treated with the filtrate of a cholera bouillon culture are refractory to infection. 8. In animals made immune, subcutaneous injection is followed by a true phagocytosis. 9. The blood-serum of guinea-pigs made immune, transferred to other fresh animals, produces apparent immunity.

Netter, ²⁰², gives the results of his bacteriological researches upon the cases of cholera or cholera-like disease observed in the western boundaries of Paris, calling attention to the probability of the similarity of these cases with cholera, by reason of the occurrence in them of bacteria resembling those of Asiatic cholera, but differing somewhat in certain of their characteristics under cultivation.

Talamon ²⁰³ brings forward many arguments in the endeavor to demonstrate the identity of Asiatic cholera and cholera nostras. The proposition is an important one, and worthy of further investigation. It would be a most interesting development if it were shown that a disease so deadly as cholera suffers a decided modi-

fication of its virulence by change in climatic, meteorologic, and telluric conditions, and perhaps, also, as a result of hygienic and sanitary provisions.

Pick,⁵⁹ in an article upon the influence of wine on the growth of the typhoid and cholera spirilla, seems to feel that various forms of white and red wine, mixed with equal quantities of water infected with either of these organisms (typhoid or cholera), destroy the infectiousness of this water and make it safe to drink.

Ferran²⁰⁵⁵ gives certain conclusions in regard to the cholera spirilla, calling special attention to the production of paralactic acid and its action upon this organism, and also calls attention to the resemblance between the chemical function of the cholera spirilla and of the bacillus coli communis. In many particulars their pathogenic functions are also similar. Paralactic acid paralyzes the chemical activity of both.

Hog-Cholera.—De Schweinitz⁹ attempted to produce immunity in guinea-pigs from hog-cholera by the use of blood-serum from animals made immune to the disease. The results of his work show that there is an easy production of immunity of guinea-pigs from hog-cholera by means of the blood-serum of animals made immune, and that there is a possible cure of the infected animals by a similar treatment. Furthermore, they point to an apparent education of the white blood-corpuscles in the blood of guinea-pigs by means of the bacterial product. The work agrees practically with that of Metschnikoff on rabbits.

Metschnikoff²⁰² comes to the following conclusions in regard to the immunity of rabbits vaccinated against the bacterium of hog-cholera: 1. The serum of rabbits vaccinated against hog-cholera presents neither a bactericidal nor antitoxic property. 2. The same serum does not possess the power of attenuating the virulence of hog-cholera. 3. In spite of the absence of these three properties, the serum of vaccinated rabbits preserves new rabbits against mortal infection by the bacteria of hog-cholera. 4. This preventive property is not found in the edematous liquid produced by the arrest of the circulation. 5. The bactericidal property in vaccinated rabbits lies in the phagocytes. 6. Pus from the vaccinated rabbits preserves for a long time virulent bacteria. 7. Vaccinated rabbits are very susceptible to the toxins of hog-cholera and do not present any antitoxic property. 8. Phago-

cytes play a very important rôle in the resistance of vaccinated rabbits. 9. The phagocytes also play a very important rôle in the resistance of non-vaccinated rabbits; but, treated with preservative serum, it is probable that this fluid, under these conditions, exercises a stimulating influence upon the phagocytes.

Cercomonas Coli Hominis.—May,²² found the cercomonas in the diarrhoeic stools of a patient with carcinoma of the stomach, and, at the post-mortem, they were found to be limited to the colon. The parasites were very numerous and in active movement, scarcely as large as a red blood-corpuscle, very glistening, and somewhat greenish in color.

Cold.—Forster, of Amsterdam,⁸, seems to have shown that certain bacteria will develop at a temperature of zero. The importance of the subject lies in the general use that is made of cold for the preservation of food products.

Coli Communis. (See also Typhoid.)—As regards the differential diagnosis between the typhoid and other bacilli found in the intestine, Theobald Smith⁶⁰ claims priority for the employment of the fermentation test. He thinks it is diagnostic, and gives it as follows: Grape-sugar in the proportion of 2 per cent. is added to peptone-broth in two glass vessels; after sterilization the two glasses are inoculated, one with the typhoid bacillus and the other with the bacillus coli; in the first vessel the medium becomes turbid throughout within twenty-four hours; in a few days the bacilli are deposited and the fluid becomes clear; not a trace of gas is observed. In the second vessel turbidity is noticed after twenty-four hours, and about one-third of the vessel is found to be filled with gas, made up of one volume of carbonic and two volumes of an explosive gas (hydrogen?).

Chantemesse, Widal, and Legry^{14, vi} call attention to two cases of infection by the bacillus coli communis, and then lay especial stress upon the differential diagnosis between it and the bacillus of typhoid by means of the fermentation test.

Roux and Rodet,³¹ maintain the identity of the bacillus coli communis and the typhoid bacillus, asserting that the differences observed are dependent upon the various conditions of cultivation to which the organism is subjected.

Lesage,⁸ summarizes the facts already known in regard to the bacillus coli communis, and lays emphasis upon the variability

in the virulence of the organism under differing conditions of nutrition and pathological surroundings.

Welch, of Baltimore,⁹ does the same thing in his presidential address before the Medical and Chirurgical Faculty of Maryland.

Tavel³ thus gives the differential points between the bacillus coli communis and the typhoid bacillus: 1. The bacillus coli has only molecular movements. 2. The growth upon grape-sugar agar is characteristic; the bacillus coli produces gas and breaks down the agar and the typhoid bacillus does not. 3. Cultures in bouillon change the color to a light red, while the typhoid cultures never change the color and never produce a pellicle upon the surface. 4. The difference upon potato is still more marked, the bacillus coli producing a greenish-yellow discoloration of the colony and a green-brown of the potato, while the growth of the typhoid bacillus is well known as being hardly distinguishable from the surface of the potato. 5. The bacillus coli has no cilia, while the typhoid bacillus has. In view of the importance of the differential diagnosis, these characteristics are of great value.

Gilbert and Lyon³ call attention to the fact that the bacillus coli communis does not always produce the effects claimed by Escherich, and detail certain inoculation experiments in which a true paresis resulted from the injection of cultures of this organism.

Vivaldi⁵⁹⁹ calls attention to an abscess of the liver in which he found the bacillus coli communis, the abscess being formed consecutively to an attack of ileo-typhoid fever.

Achard and Renault³ found, in the kidneys of a woman pregnant and suffering from nephritis, a bacillus exactly resembling the bacillus coli communis, and their work seemed to show the exact resemblance between this bacillus and the bacillus pyogenes.

Roux²¹¹ gives an account of a bacillus coli communis that did not have the power of fermenting lactose. The discovery of this special bacillus coli destroys one of the principal arguments of those who oppose Rodet and Roux, and is a matter of considerable importance.

He also showed a series of Peyer's patches in the rabbit much tumefied and congested, produced, one by this bacillus coli, and the other series by typhoid bacilli, and concludes his article by

saying that he is more and more convinced of the identity of the specific group of the bacillus coli and the bacillus of Eberth.

Vallet¹⁸⁸, speaks very interestingly of the bacillus coli communis and the bacillus of typhoid, and contrasts them as follows : 1. Cultures of the two present very great variability and are exceedingly difficult to separate by constant characteristics. 2. Their pathogenic effects are seen to be identical. 3. The bacillus coli is found in out-houses, where it flourishes, and it grows well in the fluids from this source rendered sterile by filtration ; whilst Eberth's bacillus does not grow, but rapidly dies, in this situation. 4. The bacillus coli isolated from this source presents well-defined characteristics, and is more virulent than that obtained from healthy intestine, and much more so than Eberth's bacillus. 5. It undergoes modifications during its passage through the body that brings it nearer to the typhoid bacillus. 6. In conclusion, it is possible to believe that the two organisms are of the same species, and that they may both produce a typhoidal process.

The work of Malvoz¹⁸⁷ is noticed at length by Firket.²⁸⁸ In this work the author has shown the activity of the organism in producing certain forms of peritonitis, and the medico-legal aspect of this activity is called to mind.

Chantemesse and Widal¹⁸⁹ speak also of the fermentation test as furnishing a satisfactory differential diagnosis between the typhoid bacillus and the bacillus coli ; the latter always produces a fermentation of sugar, while the former never does.

Desiccation.—Sirena and Alessi¹⁹⁰, detail their experiments upon the effect of desiccation by different means upon bacteria. Their conclusions are as follow : (1) desiccation is a potent means of disinfection ; (2) its bactericidal action is due to the abstraction of the water from the bacteria themselves ; (3) the more rapid and complete the abstraction of the water, the more rapid and complete is the disinfection ; (4) the difference in the action of desiccation depends upon the difference in species of bacteria ; (5) the direct rays of the sun are the most effective disinfectant for even the most resisting organisms.

Diphtheria.—Abbott¹⁹¹ publishes an article containing further studies upon the relation of the pseudodiphtheritic bacillus to the diphtheritic bacillus, which is an interesting contribution to the literature of the subject.

Ashby ² states that the most ready method for the detection of the diphtheria bacillus is to detach a small piece of membrane, and place it for five minutes in a 2-per-cent. solution of boracic acid, then to draw the piece of membrane along the surface of sterilized blood-serum in a test-tube, and maintain it at a temperature of 37° C. (98½° F.) from twelve to twenty-four hours. At the end of this time the bacilli are present, and characteristic small, white, rounded colonies are visible along the track of inoculation. To obtain a pure cultivation, a second or third preparation must be made. The bacilli are thicker than the bacilli of tuberculosis, mostly joined together in twos or more, and their ends are darker than the central portions.

Martin ²⁰² records his observations upon two hundred cases of diphtheria in children, showing that the pathological examination furnishes the most certain and the most rapid means for making the exact diagnosis of diphtheria. There are pure diphtherias, and there are diphtherias mixed with other bacteria; among the latter, those in which the streptococci are found are the most severe; those in which certain forms of micrococci are found are the least severe. The temperature curve furnishes an excellent guide for prognosis.

Erysipelas.—Kirchner ⁵⁰ brings forward a case furnishing what he thinks is absolutely the last link in the chain of evidence showing the identity of the streptococcus pyogenes and the streptococcus erysipelatis.

Excretion.—Pernige and Scagliosi ⁶⁹ present the results of an elaborate inquiry upon the excretion of bacteria from the living organisms. They conclude as follows: 1. The staphylococcus pyogenes aureus, the bacillus subtilis, the bacillus pyocyaneus, and the bacillus prodigiosus, when injected into the body, pass out in various ways. Almost always they are excreted with the bile and urine, but sometimes, also, through the different mucous membranes of the nose, mouth, trachea, stomach, vagina, etc. Transference of the hay bacillus from mother to foetus has been observed by the authors. 2. The excretion of bacteria begins in from four to six hours and continues until the animal dies. In the case of pathogenic bacteria it is delayed for from twenty-four to forty-eight hours, when non-pathogenic bacteria are introduced. The bacillus anthracis and the bacillus pyocyaneus retain their virulence when

excreted. 4. The kidneys show changes in all cases in which the injected bacteria appear in the urine, consisting chiefly in hyperæmia, blood extravasation, and a degenerative state of the renal epithelium. 5. Bacteria are found in the blood in from four to six hours after subcutaneous inoculations. 6. Cultures are obtainable from various organs before bacteria can be demonstrated in the blood.

Gas-Producing Bacillus.—Welch and Nuttall⁷⁶⁴ give a very complete account of a gas-producing bacillus, "the bacillus aërogenes capsulatus," which is capable of rapid development in the blood-vessels after death. The description and the experiments with this organism are exceedingly interesting and complete.

Glanders.—Nocard⁸¹ writes upon the use of "mallein" for the diagnosis of glanders. This mallein is a glycerin extract of the cultures of the bacilli of glanders, just as tuberculin is the glycerin extract of the cultures of the bacilli of tuberculosis. Just as tuberculin does, mallein possesses a special elective action upon the lesions produced by the specific bacillus, and also, just as tuberculin in bovine tuberculosis, mallein appears to play a rôle of the first importance in the diagnosis and preventive hygiene of equine glanders. The first evidence of this important fact was brought forward by two Russian veterinarians, Kolning and Hellman, of whom the first paid for his discovery with his life.

Gonorrhœa.—Wertheim⁸⁰ gives an account of a method by which pure cultures of the gonococci may be obtained upon plates with a nutrient medium of sterilized human blood-serum.

Herpes Labialis.—Symmers² gives a full description of a new chromogenic micro-organism found in the vesicles of herpes labialis, that he calls the bacillus dillidan. It occurs either as a rod or thread. The threads are either in true or pseudo filaments; the filaments are mostly solid, without division; sometimes very long, with tapering ends; often twist back upon themselves, curving in various directions, and flexible. Neither cocci nor spirals have yet been seen.

Immunity.—Gamaleia⁸⁸⁸ thus sums up the present status of knowledge concerning the production of immunity to certain diseases. By reason of a fundamental property of the organism, animals susceptible to a true infection react to the introduction of a vaccine, and animals non-susceptible to the infection react to the introduction of the virus of the infection by the production of de-

sensive proteids. These defensive proteids can be isolated, and have the property of destroying the formed or chemical agents of the malady. They bring about this destruction both in the test-tube and in the bodies of the animals into which they are injected. As a result, by introducing these proteids into the body of susceptible animals, they are rendered refractory to the disease. When introduced into the economy of animals already infected, the proteids cure them. This cure has been experimentally established for tetanus, diphtheria, hog-cholera, and pneumonia. For tetanus and pneumonia the principle of immunization has been applied with some success to human beings ill of these diseases. G. and K. Klempner ⁴, speak of the cure of infectious diseases by subsequent immunizing. The authors say that there is no doubt, after their experiments, that there is an assured theoretic basis for the use of serum, and its value for mankind is considered possible. The method is most troublesome as now applied, and some simple means of immunizing which will produce the same results should be sought.

Inflammation.—Sanderson ² publishes his Croonian lectures on the progress of discovery relating to the origin and nature of infectious diseases. One lecture is devoted to the etiology of inflammation; the remaining, to the consideration of the general processes in pathology that have been the subject of so much discussion of late years. His lectures, as a whole, form a complete summary of our knowledge of the subject up to the time of their delivery. Howard ¹⁶⁷ gives a long summary and account of the part played by the leucocytes in inflammation, in the light of recent bacteriological investigations.

Influenza.—Pfeiffer and Kitasato and Canon ³⁹ announce the discovery of the specific bacillus of influenza. Pfeiffer describes the organism, and Kitasato tells how to cultivate it, whilst Canon confirms the work independently by having found the same organism in a separate series of cases. The work of the first two is also given in full ² from advance sheets, and Pfeiffer ¹⁴, says: "The bacilli appear as very tiny rods of about the thickness of the bacilli of mouse-septicæmia, but only half the length of these. One often sees three or four bacilli strung together in the form of a chain. They stain with some difficulty with the basic aniline dyes. Better preparations are obtained with dilute Ziehl's solution or

with hot Löffler's methylene blue. In this way it can be seen, almost as a rule, that the two ends of the bacilli take the stain more intensely than the centre; so that forms are produced that can with difficulty be distinguished from diplococci or streptococci. In fact, I am inclined to believe that some of the earlier observers all saw the bacilli described by me, but that, misled by their peculiar behavior toward staining reagents, they described them as diplococci or streptococci. They cannot be stained by Gram's method. In hanging drops they are immobile."

Cornil and Chantemesse⁸ recount their experiments upon influenza, and seem to show that they had succeeded in isolating the same organism as that of Pfeiffer. Teissier, Roux, and Pittion⁹ record the occurrence of a new pathogenic bacillus that they found in the blood and urine of persons affected with influenza,—occurring either as a diplobacillus or as a streptobacillus, in short chains, and that, when introduced by intra-venous injections into the blood of rabbits, produced a change having some analogy to the influenza in man. Tizzoni⁵⁸⁹ gives the result of a very considerable number of experiments upon the resistance of the bacilli of influenza to physical and chemical agents, tending to show that this organism has no very great resisting power. Bruschettini,⁵⁸⁹ from a large number of experiments, concludes as follows regarding the influenza bacillus: 1. It is non-pathogenic for the dog or white mouse, but is distinctly pathogenic for rabbits or guinea-pigs. 2. Injected into the trachea, or sometimes when introduced into the circulation, it produces a diffuse bronchitis in the less serious cases, with considerable rise of temperature; in the more severe cases it produces an interstitial broncho-pneumonia. 3. Injected into the serous cavities, it gives rise to an abundant serofibrinous exudation. Péchère,⁸⁸⁸ in a second communication upon the bacillus of influenza, confirms the results of Pfeiffer. He gives the following method for staining: The blood is dried in the air upon the cover-glasses, and these are then placed in alcohol (70 per cent.) two or three minutes; then they are immersed, at 37° C. for four hours, in the following solution: Eosin, $\frac{1}{2}$ -per-cent. solution, 20 parts; saturated watery solution of methylene blue, 40 parts; distilled water, 40 parts. The red globules are colored red, the white corpuscles and the bacilli, blue.

Intestines.—Sundberg²⁰⁵⁹ gives the result of his researches

upon the possibility of the penetration of the intestinal mucous membrane in a healthy condition by the various bacteria. The only organism to which he could attach such a property was the bacillus of chicken-cholera.

Leptothrix.—Schmorl²⁰⁰ found, in an epizootic which destroyed a number of rabbits in the Pathological Institute of Leipzig, a bacterium that belongs to the class of leptothrix, or to that of the cladothrix. It could be obtained in pure cultures; was an obligatory anaërobic organism. It produced sphacelation, extending rapidly in the subcutaneous tissue, and by fibrinous inflammation of the mucous membranes, as well as by inflammatory lesions in the lungs. Guinea-pigs, dogs, cats, and fowls were refractory to this organism. It could develop in the bodies of men and of guinea-pigs, where these had been attacked by pyogenic bacteria, but it was not itself pathogenic for man or for the guinea-pigs.

Light.—Buchner²⁰¹ gives the following simple and effective method for demonstrating the effect of light upon bacteria. Nutrient agar is liquefied and inoculated with a given sample of a micro-organism. In the case here described the typhoid bacillus was used. As uniform distribution of the germs as possible is secured. The agar is then poured into a glass dish with a glass cover and allowed to harden. A cross of black paper is fixed upon the under surface of the dish, and this surface exposed to direct heat and light for from one hour to one hour and a half; for diffused heat and light, for five hours. The agar plate is then placed in the dark. In twenty-four hours there is seen beneath the paper cross another, sharply defined, formed by the colonies which have developed; the rest of the plate remains sterile.

Geisler experimented upon the action of light upon the typhoid bacillus, the bacillus coli, the bacillus pyocyanus, the bacillus of cholera, and the various bacteria of putrefaction suspended in water. The results obtained were: constant light exercises a destructive action upon these micro-organisms; for example, a flask that contained about, approximately, 100,000 bacilli coli did not contain a single one after direct exposure for an hour to the light of the sun; whilst less active, the diffused daylight also exercised a destructive action upon these bacteria.

Leucocytes.—Dineur,²⁰² as the result of many researches upon the sensibility of the leucocytes to electricity, comes to the follow-

ing conclusions: "1. The leucocyte is endowed with a special sensibility to electricity, and I propose to give to this property the name of galvano-taxism. 2. The galvano-taxism of the normal leucocyte guides it with a marked preference toward the positive pole, which I shall call positive galvano-taxism. 3. The galvano-taxism of the leucocyte in inflammation directs it, on the contrary, toward the negative pole, which I shall call negative galvano-taxism."

Malaria.—Danilewsky²⁰² carries out his studies upon malaria in birds, and re-affirms his opinion that the organisms of malaria of birds and of men belong to the same group, perhaps even to the same race of parasites. He finds that birds can be affected with three forms of malaria: (1) acute infection with fever, grave phenomena, and so on, characterized bacteriologically by an organism entirely analogous to that observed in man; (2) a chronic infection without a febrile stage, that shows in the blood forms that complete the parallelism with man; (3) a mixed infection characterized by these different forms of the parasites associated together. Troizki²¹ records a long series of observations upon the blood of persons affected with malaria and other diseases, never having succeeded in finding the plasmodium of Laveran in any cases but those of malaria. The non-occurrence of the pigment in the plasmodium was only observed in the cases where there was an intermittence of the disease.

Malignant Cedema.—Penvo⁵⁰ gives the result of a very careful study of the bacillus of malignant cedema, and brings out many new characteristics by which this organism may be identified.

Measles.—Canon and Pielicke^{2, Ap. 28; 4, Ap. 19} have succeeded in isolating a bacillus which they consider the specific organism of measles. It was found in fourteen cases of the disease, in the blood as well as in the sputum, and the nasal and conjunctival secretions. It differs essentially from the organisms previously suspected as being the cause of the disease. It is very variable in size, sometimes as long as one-half the diameter of a red blood-corpuscle, sometimes quite small, with the appearance of diplococci. It was found during the whole course of the disease, as a rule most abundantly at the time of defervescence. Bacilli of the same shape as those found in the blood were seen in the expectoration. They stain easily, but are not easily cultivated, so far as appears by any method tried by the authors.

Milk.—Brieger and Ehrlich ⁹⁹, undertook a series of experiments upon the transmission of immunity by milk, in which they seem to have distinctly obtained the transference of immunity from animals made immune to animals susceptible to the disease, by milk coming from these immune animals.

Necrosis.—Bang ²⁰⁵⁷ has described a new bacillus, the “bacillus necroseos,” producing many diseases in domestic animals that are characterized by the necrosis of different tissues. These diseases are diphtheritis of calves, diphtheritis of the bowels and womb of cows, malignant foot-rot of cattle, a similar affection of dogs; also different affections of the heart, lungs, and liver; in horses, the same microbe produced diseases of the hoof and of the bowels; in the pig, a diphtheritic affection in the mouth. Löffler has already described the same bacillus in the diphtheria of calves, but not in the other diseases mentioned.

Plate Cultures.—Salomonson recommends the cultivation of bacteria in small quadrangular bottles, such as tincture bottles.²⁰⁵⁸ The gelatin is solidified on the side of the bottle, which is turned upward; when, afterward, the gelatin is liquefied by the growth of microbes, the melting parts fall down in the bottle without infecting the other parts of the gelatin, that can be easily observed.

Pneumonia.—Condamin ²¹¹, records a case of multiple suppuration, consecutive to a suppurative otitis, which presented characteristics different from those usually observed. Multiple abscesses formed, from fifteen to eighteen of which cultivations were made, and showed the pneumococcus of Fraenkel in a state of purity. Franklin, Stanley, and Frew ²¹², follow up previous work on the substances formed in the cultivation of Friedlander's pneumococcus. Brieger found that, on growing this micro-organism in solutions of grape- or cane- sugar, he obtained acetic acid, with some formic acid and ethyl alcohol. The results of these further experiments are summarized as follows: 1. The pneumococcus of Friedlander sets up a fermentative process in suitable solutions of dextrose, cane-sugar, milk-sugar, maltose, rafinose, dextrin, and manitol. 2. It does not ferment solutions of dulcitol or glycerin, and has thus the power, like the bacillus ethaceticus, of distinguishing between the isomers manitol and dulcitol. 3. In the fermentation of dextrose and manitol, the principal products are ethyl alcohol and acetic acid, with a smaller proportion of formic acid,

and traces of a fixed acid, succinic acid. The gaseous products are carbonic anhydride and hydrogen.

Psorospermosis.—Rosenberg¹³ records the observation of a form of psorosperm (sarcosporidia) in the heart-muscle of human beings, the peculiar shapes and unusual forms of which are well shown in the illustrations on page 18.

Ptomaines.—Ferreira de Silva¹⁴ gives the following comparisons between the ptomaines and the vegetable alkaloids: (1) the different stages of decomposition produce different basic substances; (2) some ptomaines from time to time disappear, and are replaced by others; (3) certain chemical bases, rare at the commencement, increase with the disappearance of the more complex basic substances. The following ptomaines have been recognized by him, and are supposed to replace each other: (1) cholina, $C_5H_{15}NO_2$, is found in the intestines; (2) neuridina, $C_5H_{14}N_2$, replaces cholina about the fourteenth day of putrefaction, and is found in the intestines and glands; (3) cadaverina, $C_5H_{16}N_2$, follows neuridina,—not, however, replacing it, as it is present from the third day of putrefaction,—but the ptomaine increases largely in amount after the disappearance of cholina; (4) putrescina, $C_4H_{12}N_2$, is present on the fourth day, but largely increasing in amount by the fifteenth day, or even the twenty-first; (5) saprina seems to have the same composition as cadaverina; (6) trimethyl-ama, $(CH_3)_3N$, appears about the seventh. All these but the first are, undoubtedly, poisonous.

Bacillus Pyocyanus.—Cadéac¹⁵ found that oxidized fixed alkaloids, in quantities varying from $\frac{1}{2}$ to $1\frac{1}{2}$ grains to the tube of gelatin, had no appreciable action on the growth or on the chromogenic function of the bacillus pyocyanus. In the larger dose, certain of them decreased the growth and suppressed the chromogenic function.

Mal Rojo (Rouget).—Jose L. Gomez, of Mexico,¹⁶ gives the results of experiments upon a number of herds of swine. These results seem to indicate that there is a slight difference between the organism that this author has been working with and those that have been studied at such length by so many Continental and American observers. The article is marked by very great care, and is well worthy of attention. (Report of Dr. Semeleider, corresponding editor, Mexico.)



PSOROSPERM (SARCOSPORIDIA) IN HUMAN HEART-MUSCLE.
(Zeitschrift für Hygiene.)

Saliva.—Samarelli⁵⁰ remarks that, considering the frequent presence of pathogenic micro-organisms in the mouth, it is remarkable that primary lesions appear so rarely, and that wounds heal so kindly there, and sums up by saying that the saliva is an unfavorable medium for certain pathogenic bacteria, destroying them, when not too abundant, more or less rapidly, and so altering the type of others—for example, the pneumobacillus—as to render them harmless.

Sea-Bacteria.—Russell, of Wisconsin,⁵⁸ gives the result of his work in investigating the bacteria contained in the water of the Gulf of Naples. His results are as follow: (1) the number of bacteria contained in sea-water is usually much less than that found in fresh water; (2) the development of the sea-water bacteria does not occur in a fixed zone, but they are found in the deep, middle, and surface portions alike; (3) the number of bacteria in the sea-mud is much greater than in an equal quantity of water, and this is not due to their derivation from the shore, but to the development of species that are indigenous to the mud itself; (4) whilst no general law of the occurrence of the bacteria in water can be formulated, there is a visible diminution in their number to 200 metres depth,—from this to the deepest test made (1100 metres) no further diminution was observed; (5) the vertical occurrence of the species observed showed that the maximum growth occurred near the surface, but that the minimum, at a depth of 1000 metres and more, did not differ very much. (See illustrations on pages 21 and 23.)

Skin.—In a short paper¹⁷ upon the elimination of micro-organisms by the sweat, it appears to be shown that this elimination is a possibility and not uncommonly occurs.

Sputum.—Aronson and Philip⁶⁰ describe a method for preparing sections of the sputum and demonstrating the eosinophilic cells in the sections. The sputum to be examined is expectorated direct into a cold saturated solution of sublimate in 0.75-per-cent. solution of sodium chloride, and allowed to stand for from six to twelve hours. Then a short washing in water, and transference into 70-per-cent. alcohol; then tinct. iodine till a Burgundy brown has been obtained; then further hardening in pure alcohol of increasing strengths. Thence the balls produced by this process of hardening are transferred to thick cedar-oil, xylol, saturated

paraffin solution; then twenty-four hours in the breeding oven, at 37° C. (98½° F.), in a saturated paraffin solution; and then four to six hours in paraffin of the usual melting-point, imbedded. In this way it was possible to obtain sections of 5 mikra and less. (For method of staining, see article.)

Suppuration.—Nissen,¹⁰ has a very important article upon the toxic effect of the blood in acute suppurative processes.

Tetanus.—Courmont and Doyon, of Lyons,⁸ record a number of experiments upon the physiological pathology of tetanus, in which they have come to the conclusion that the poison of tetanus is not a muscular poison, but affects the nervous system.

Tuberculosis.—Legrain,¹⁴ found a short bacillus in the sputum of a person affected with pulmonary tuberculosis, which, upon inoculation in rabbits, produced a chronic infection, characterized by the development of tubercles of various sizes that underwent cheesy transformation. By reason of its etiology and its rapid evolution, this process is easily to be distinguished from true tuberculosis, and the various zooglyc tuberculosis already described. It presents a very close resemblance to the parasitic disease transmissible from man to rabbits, recently discovered by Du Casal and Vaillard. Maffucci,³ concludes that the protoplasm of the bacilli of tuberculosis contains a toxin that may not be destroyed by heat, and that, therefore, the precaution of heating tuberculous materials used for food may not be effective. Sibley,² succeeded in producing tuberculosis in specimens of the common English grass-snake and the common viper. As the result of these experiments, and a case of spontaneous tuberculosis in a snake, described in a former paper, the disease can no longer be considered as confined to the higher or warm-blooded animals; the fact being discussed as to whether the disease tuberculosis had been produced,

Explanation of Illustration I.—*Cladothrix intricata.*—Fig. 1A, spiral threads from a gelatin plate colony; 1B, the varying development of the so-called branches; 1C, the growth stages of the pseudo-branches; 1D, spores from an agar culture; 1E, three-day-old gelatin needle culture.

Bacillus granulosus.—Fig. 2A, young gelatin plate culture (surface); 2B, a, b, c, normal forms in gelatin plate cultures; ff, in old gelatin cultures; g h, abnormal forms from potato cultures (at h spores).

Bacillus thalassophilus.—Fig. 3A, four-day-old gelatin culture from the upper part; 3B, a, drumstick forms on gelatin; b, bacilli stained with Ziehl, c, unstained bacilli; e, spores from a gelatin culture.

(Fig. 1 and Fig. 2 drawn with Zeiss $\frac{1}{2}$ hom. im. and Oc. II; the others with Oc. IV.)

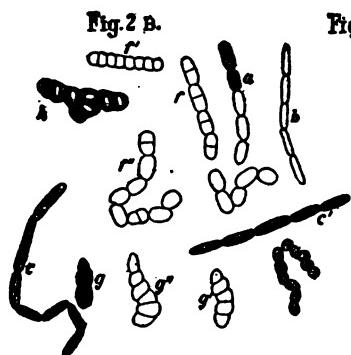


Fig. 2 A.

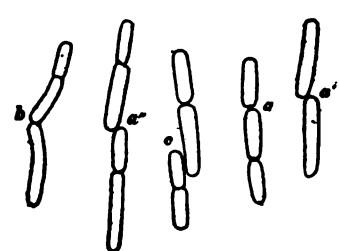
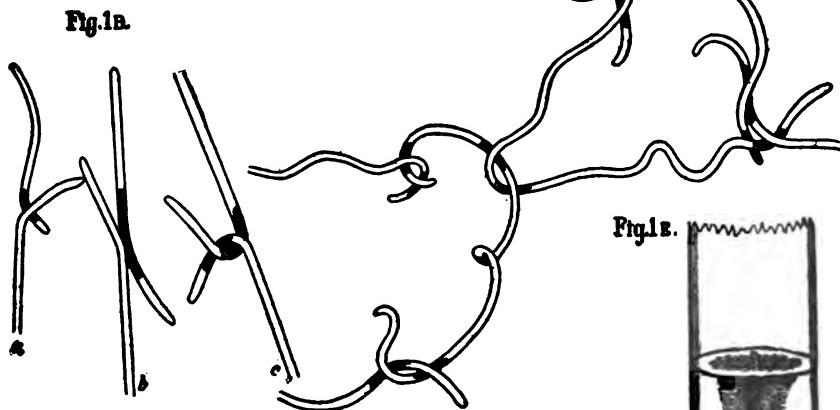


Fig. 1 D.

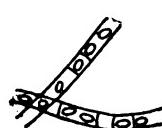


Fig. 1 A.



or whether only pure cultures of the bacilli of tuberculosis grown in the animal body had been obtained; that is to say, if the snake might not be looked upon in the light of test-tubes containing a nutrient medium, in, or on, which the bacilli had simply grown. Gramatschikoff⁸⁵⁴ describes a method by which the bacillus of tuberculosis may be attenuated. The diminution of virulence is obtained by placing pure cultures inclosed in membranes of various kinds in the peritoneal cavities of fowls, the degree of the diminution of virulence depending upon the length of stay in the fowl's body.

Petroff,⁸⁵⁵ experimenting with tuberculin upon the growth of the bacillus subtilis and staphylococcus aureus, found that the addition of 3 per cent. of tuberculin to the nutrient media did not in the least check the growth of either of these organisms, although it prevented the liquefaction of gelatin usually caused by the bacillus subtilis. Tizzoni and Cantani⁸⁵⁶ seem to suspect the existence of a principle conferring immunity against tuberculosis in the blood of animals that have been subjected to tuberculin. Buchner⁸⁵⁷ claims to have substantiated Roemer's observations,⁸ in which it was asserted that a typical tuberculin reaction could be obtained with an extract from Friedlander's bacillus of pneumonia, the bacillus pyocyanus, and the bacillus prodigiosus. Injections of proteids from these bacilli produce fever in dogs, a local reaction when injected into the forearm of a healthy man, and when tuberculous guinea-pigs were injected with the material the exact macroscopic and microscopic appearances described by Koch as pathognomonic of tuberculin reaction were produced. Héricourt and Richet⁸⁵⁸ found, on experimenting with two monkeys: one, susceptible to inoculation with human tuberculosis; the other, insusceptible to inoculation with avian tuberculosis.

Explanation of Illustration II.—Bacillus limosus.—Fig. 1A, two-day-old sea-gelatin needle culture; 1B, bacilli from needle culture.

Spirillum marinum.—Fig. 2A, two-day-old sea-gelatin needle culture; 2B, two-day-old normal gelatin needle culture; 2C, young gelatin plate culture (surface); 2D, single spirilla.

Bacillus litoralis.—Fig. 3A, ten-day-old gelatin plate culture (surface); 3B, ten-day-old gelatin needle culture; 3C, bacilli from hanging drop.

Bacillus halophilus.—Fig. 4A, two-day-old sea-gelatin needle culture; 4B, nine-day-old normal gelatin culture; 4C, abnormal forms of bacilli; a, b, c, from normal gelatin; A, from sea-gelatin culture made on the following day.



Fig. 1 B.

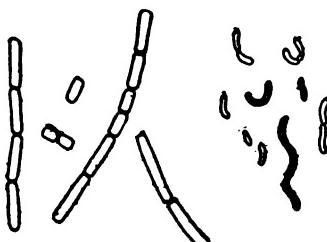


Fig. 2 B.



Fig. 2 A.

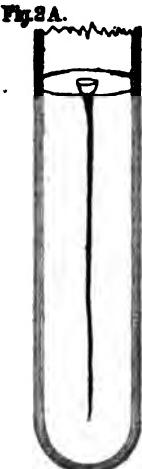


Fig. 4 C.



Fig. 4 D.



Fig. 4 A.



Fig. 3 C.



Fig. 3 A.



Arens⁵⁰ gives a method for staining bacilli of tuberculosis, among other bacteria or in fat-containing substances. Cover-glasses are prepared in the usual way, and are then placed in a watch-glass containing from 12 to 13 drops of acidulated alcoholic solution of methylene blue and 3 to 4 centimetres of chloroform. They are stained then from four to six minutes, the chloroform is decanted, the methylene blue is washed off with water, and the cover-glasses are put under the microscope. In fresh milk and in cream, only the bacteria are stained a dark blue. In turned milk the clumps of casein are also stained a light blue, but the sharp definition of the deeply-stained bacteria prevents confusion.

Grancher and Ledoux, and le Bard,⁴⁵⁷ give results of experiments with heat on the vitality and virulence of the bacilli of tuberculosis. For avian tuberculosis cultures heated to 50 degrees, for ten to fifteen minutes, preserve their vitality and their virulence; to 60 degrees, for ten to fifteen minutes, the cultures develop slowly and their virulence becomes attenuated; to 70 degrees, and during one minute, they lose their vitality, and, for fifteen minutes, they lose their virulence, but upon inoculation they may produce changes by their toxin. With these cultures so treated, then, it is possible to produce all the lesions that can be obtained with active cultures, but they are neither virulent nor transmissible. The authors propose to call such lesions micro-tuberculosis. Foa⁷³⁰ reports that he had found, in the body of a man who had died of disseminated tuberculosis, that the vesiculæ seminales were crowded with semen, which was full of bacilli of tuberculosis, while the other genito-urinary organs were healthy. Heiman¹ gives the result of a series of experiments upon the bacilli of tuberculosis with certain of the stronger disinfectants, and upon the length of time that this organism may live outside the body. Héricourt and Richet,²⁰⁸ speaking of the vaccination of the dog against tuberculosis, draw the following conclusions from their work upon the subject: "We may hope to find, among the various bacilli of tuberculosis, some varieties that will produce a vaccination; and that probably among the mammalia the avian bacilli, which are almost innocuous, may, by some process of evolution, be capable of producing a vaccination against true tuberculosis of the human race." An editorial⁶ quotes the work done under the direction of the Baden government in testing tuberculin as a

diagnostic means, with the result that all the animals tested that showed any reaction were found to be tuberculous, while those that did not react were found not to be tuberculous.

Letulle⁷, gives a method for staining bacilli of tuberculosis in tissues that have been for a long time in Müller's fluid: 1. Complete the hardening in alcohol; if already hard, pass through alcohol cut in celloidin. 2. Place the section in hæmatoxylin to stain the nuclei; wash in water. 3. Place in the following solution for at least a quarter of an hour: 2-per-cent. carbolic acid, with rubin q. s. to saturation; wash in water for one minute, and (4) place in absolute alcohol one minute; then (5) five minutes in the following solution: carbolic acid (2 per cent), 100 grammes; iodine green, 1 gramme. 6. Decolorize carefully in absolute alcohol. 7. Clear in bergamot, followed by xylol; mount in xylol balsam. The nuclei appear violet, the hyalin bodies a cherry-red, and the bacilli of tuberculosis a carmine-red.

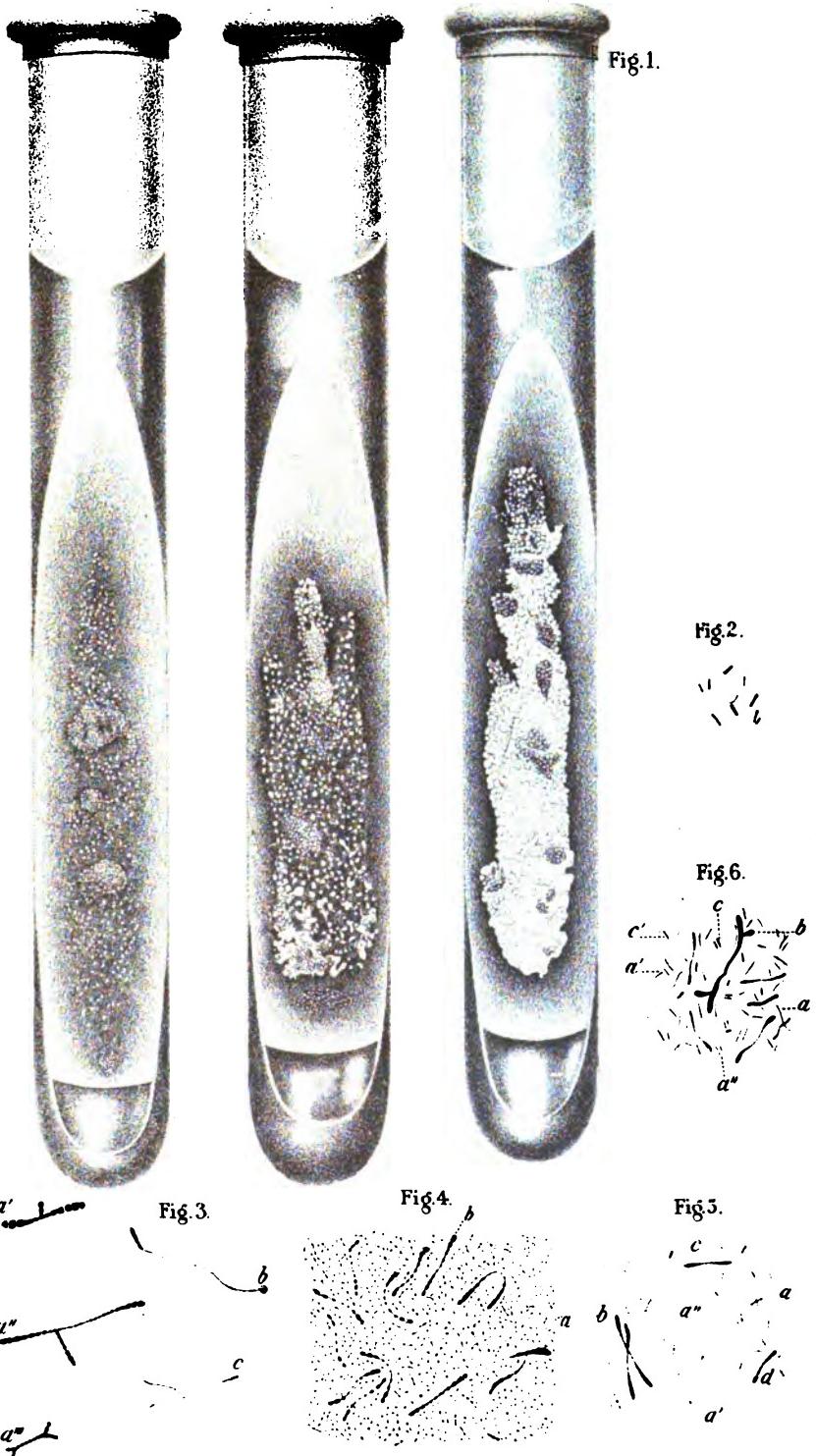
Richet and Héricourt⁸, give further evidence of the protective power of vaccinations of avian tuberculosis against mammalian tuberculosis in dogs by adducing the evidence of twelve dogs—eight vaccinated and four control; of these, the four controls were all dead, while the eight vaccinated were all apparently well and gaining. This is confirmatory of their statement in the same journal, p. 127, 1892. Pastor⁵⁰ suggests a method for obtaining pure cultures of bacillus of tuberculosis from sputum, as follows: shake the sputum up with pure water and filter through muslin; nutrient gelatin is then inoculated with a drop of the filtrate in plates and kept at the room temperature for a few days. At the end of this time there will appear colonies of bacteria, with clear spaces between; these latter are cut out very carefully and rubbed over blood-serum, and a certain proportion of these will always furnish pure cultures of the bacillus of tuberculosis. Eber⁶⁹ records the result of his experiments with tuberculin as a diagnostic agent in cattle, which do not seem to be quite so encouraging as others—not seeming to indicate that so much reliance may be placed upon it as some other observers have claimed.

Trudeau, of Saranac Lake, N. Y.,⁹ has been experimenting with tuberculin, Hunter's Modification, and other products of the bacilli of tuberculosis, with the following results: 1. Koch's

tuberculin does not cure experimental tuberculosis in the guinea-pig, although its specific influence on the primary lesions is indisputable. 2. Hunter's Modification C. B. contains less of the remedial principle than tuberculin, and is apparently quite as dangerous. 3. Hunter's Modification B. is as effective as tuberculin and free from some of its dangers. 4. Solutions obtained as described, from well-washed tubercle bacilli, have, when extracted with 50 per cent. of glycerin and water, an injurious effect; when treated with hot alcohol, a doubtful and, at best, feeble remedial influence over experimental tuberculosis. 5. They produce suppuration and serious structural impairment, which may result in organic disease and death. 6. The liquid culture medium in which tubercle bacilli have developed, but from which they have been removed by filtration, contains the elements that bring about reaction and cure in tuberculous tissues. 7. Experimental tuberculosis in the rabbit's eye can be cured by injections of the filtered culture media. 8. The permanency of such a cure has not yet been proved.

The Report of the Congress for the Study of Tuberculosis,²⁰⁰ held in Paris in 1891, and the most important papers of which were reviewed in the 1892 issue of the ANNUAL, contains many interesting articles by the best men of the French school. Several appear upon the relation of tuberculosis in man and the mammalia, the conclusion being that the bacilli in the tuberculosis of birds is a variety of the Koch bacillus, though not identical with it. Chauveau adds another link to the chain of evidence that human and bovine tuberculosis are identical. Pseudotuberculosis in rabbits is considered. In regard to etiology, Arthaud brings forward an interesting subject: In one hundred cases of acute pulmonary tuberculosis, he found that 80 per cent. had, within a short time, moved into houses where persons with advanced tuberculosis had lived. Perroncito again shows that the danger from eating meat from tuberculous animals is at least not emphasized by the experiments made in the laboratory. A large portion of the book is devoted to therapeutic measures. The most favorable results are claimed from the use of subcutaneous injections of creasote-oil, the proportion used varying from 1 to 15 to 1 to 3 parts in almond-oil.

Tuberculosis of Birds.—Maffuci⁵⁸ details a number of exper-



Bacillus butyricus. (Botkin).

Zeitschrift für Hygiene.



Fig. 3.

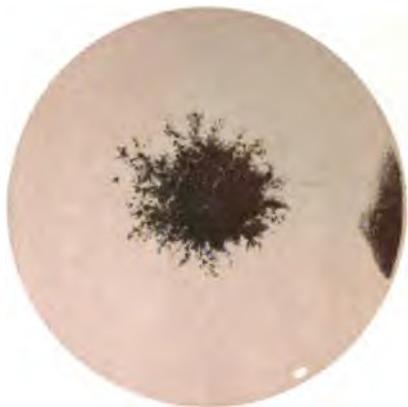


Fig. 2.



Fig. 1.

Bacillus butyricus. (Botkin).
Zeitschrift für Hygiene.

iments upon tuberculosis of fowls, and comes to the following summary in regard to the differences between the bacilli of avian tuberculosis and that of the mammalia: (1) the bacilli of avian tuberculosis do not produce tuberculosis in guinea-pigs and rarely a generalized tuberculosis in rabbits; (2) the cultures on the different nutrient media have different characteristics from those of mammalian tuberculosis; (3) the developmental temperature is between 35 and 45 degrees, and the sterilization temperature is 70 degrees; (4) between 45 and 50 degrees this bacillus produces in cultures long, thick, and branched forms; (5) the bacillus retains, after two years, its vegetative and pathogenic powers; (6) the growth of the bacillus produces a substance that is poisonous for guinea-pigs, but only slightly so for fully-developed fowls; (7) the tuberculosis produced by this bacillus does not contain giant-cells. The bacillus of mammalian tuberculosis differs from the bacillus of avian tuberculosis as follows: (1) it produces tuberculosis in guinea-pigs, rabbits, but not in fowls; (2) its cultures behave differently from those of the preceding; (3) it develops between 30 and 40 degrees; (4) it will not withstand a temperature of 65 degrees over an hour; (5) it does not alter its form in cultures between 43 and 45 degrees; (6) at 45 degrees it loses in a few days its vegetative powers; (7) moist cultures of a year old can be only with difficulty transferred to other nutrient media or animal tissues; (8) the growth (*zerstorung*) of the bacillus produces a substance that is hurtful to guinea-pigs and generally to well-developed fowls; (9) the tubercle of mammalia contains mostly the giant-cells.

Explanation of Plate.—Avian Tuberculosis.—Fig. 1, Growth at 37 degrees; 1, culture at 15 days; 2, culture at 1 month; 3, culture at 40 days. Fig. 2, Bacillus of avian tuberculosis 1 month old; culture at 37 degrees (oc. 4 to 4.5 mm., obj. 20 mm., apert. 1.80. Homog. im. apochromatic. Zeiss). Fig. 3, Culture at 45 degrees for 2 months; branched forms. Fig. 4, Culture of 3 months at 45 degrees; a, mass of long, granular bacilli; b, long, clavate, and granular bacilli. Fig. 5, Culture at 50 degrees, 8 days old; a a' a'', colorless and granular bacilli; b c d, long, stained, and clavate bacilli. Fig. 6, Culture at 50 degrees for 18 days; a a' a'', long and colorless bacilli; b, long, stained, branched, and clavate bacilli; c c', short and stained bacilli.

Typhoid Fever.—Karlinski, following out his researches of the behavior of the typhoid bacillus in water, has carried out a long series of experiments upon the same organism as it occurs in the earth.³²⁴ His conclusions are as follow:—

That the longest existence of the typhoid bacillus in earth does not extend further than three months. During the destruction of the organs of the individuals who have died of typhoid fever, the temperature may rise considerably, sometimes even as high as 30° C., and under such circumstances the presence of the typhoid bacilli can still be demonstrated, at the end of three months, in the bodies of persons dead of typhoid, under circumstances where putrefaction is retarded, and that prevent the access of specific germs of putrefaction.

Glaudot⁴⁵⁴ gives the differential characteristics between the typhoid bacillus and the pseudotyphoid organisms, as follows:—

TYPHOID BACILLUS.

- A. Motile. Characteristic cilia, long and numerous, etc.
- B. Development negative or very slight in certain mineral media : Nageli's, Peterman's fluid, etc.
- C. Absence of indol, or merely traces after eight days.
- D. Formless development of a layer that is very slightly apparent upon certain opaque-white media (potato, etc.).
- E. Decomposition of media containing glucose with no gas production.
- F. No coagulation of neutral or alkaline milk even after a month.
- G. Very feeble action upon lactose, glycerin, etc., with no production of gas.

PSEUDOTYPHOID BACILLUS.

- A. Non-motility, or very little. No cilia, or else cilia less long, less numerous, or different from those of the true typhoid.
- B. Abundant multiplication.
- C. Indol in appreciable quantity.
- D. Colored or formed growth on these media.
- E. Decomposition of glucose with gas production.
- F. Some coagulate milk in mass with gas ; others precipitate casein without gas ; still others slowly dissolve casein without coagulating it.
- G. Active fermentation of lactose, maltose, glycerin, etc.

Löffler's method of employing the bacillus typhi-murum, as detailed,⁵⁰ was tested for destroying mice in large numbers in the recent plague of field-mice in Thessaly. The method adopted is well summarized.⁵¹ The final result of the experiment at the expiration of four weeks seemed to be entirely satisfactory. It seems clear, indeed, that the measures adopted had saved the harvest in Thessaly.

Kelsh⁵² reports the discovery of the bacillus of Eberth, the typhoid bacillus, in the pus from a case of pleurisy. The patient had no intestinal lesion.

In ²¹¹ may be found a series of articles upon the typhoid bacillus of Eberth, and the pseudotyphoid bacilli found in the various river-waters, by Cassedebat, in which he summarizes the knowledge that has thus far been gained in regard to these various organisms and their reactions, and in which he seems to feel that the production of typhoid through water is not to be so much feared as has been supposed.

Karlinski ⁹⁹⁶ gives the following as the result of his experiments upon the typhoid bacillus: (1) these bacilli cannot live more than three months in the earth; (2) the bacilli excreted and mixed with the earth cannot live as long as the bacilli in pure cultures, probably because their vitality is diminished by the bacteria in the excreta; (3) in adding water to the earth the vitality of the typhoid bacilli is lessened; (4) at a short distance in the ground these bacilli can resist much more effectively other bacteria than at a greater depth; (5) on the surface of the earth, under the interference of rain or sun, the vitality of the bacilli is diminished; (6) during the putrefaction of the organs of persons dead of typhoid, there is observed a great rise of temperature, and the typhoid bacilli can be found in the detritus after even three months.

Bitter ⁵⁸ gives the result of a number of experiments upon animals with the toxin of typhoid bacilli. The results are not very conclusive, but may not be without value in the investigation of this subject.

Fuller, ³⁰ as the conclusions in an article upon the differentiation of the bacillus of typhoid fever, gives the following: The potato method of differentiation is of no diagnostic value. The three tests that have been found to be highly diagnostic (after non-liquefaction) are: 1. Non-coagulation of milk. 2. Non-formation or formation of a very slight amount of acid in milk. 3. The production of a turbidity without gas in the fermentation test. (See Theobald Smith in ⁵⁰ v.7, p.265; v.11, p.227.)

Urine.—Hein ⁸⁴ describes an organism found in acid urine in the case of a 20-year-old man suffering from incontinence. It develops well at the temperature of the body, upon the usual culture media, and does not liquefy gelatin. It behaves well with the usual aniline colors. It also stains according to Gram. It produces an acid and has apparently no pathogenic properties toward animals. The patient did not appear to have gonorrhœa or tuberculosis.

Krogius ⁵⁵ reports the discovery of a bacillus in cases of bladder affections and pyelo-nephritis, resembling very closely that already described by Clado, Albarran, and Halle, and is struck by its close resemblance to the bacillus coli communis of Escherich, going so far as to consider them identical.

Variability.—Adami ⁵⁰ gives a long review of all the evidence favoring the idea of the variability of bacteria and the development of races of the same. The results are entirely in accord with work previously done and summaries previously made, tending to show that, under varying conditions of surroundings, nutrition, etc., bacteria may change their peculiarities, but that there is always a standard to which they tend to return.

Vaccine.—In ⁸⁵⁵ are the results of investigations made respecting the purity of vaccine virus, in which there were obtained, among the pathogenic forms, the following: The staphylococcus pyogenes, the staphylococcus aureus, the staphylococcus citreus, the bacillus pyogenes foetidus, the bacillus septicus, a bacillus that was connected with and probably the cause of gangrene, a micrococcus in connection with another case of gangrene, and a saprogenous bacillus in connection with septic lesions.

Vibrioaricide.—Bruhl ⁵⁵ gives the results of experiments upon the vaccination of the rabbit against the vibrioavicide, and on the curative action of the serum of the rabbit protected against infection by this vibrio. His conclusions are as follow: 1. The serum of the normal rabbit has neither a vaccinating nor a curative power. 2. The serum of a rabbit made immune has not only a vaccinating, but a curative, power. It is interesting, by this method, to demonstrate the curability of a septicæmic infection that travels so rapidly, and whose result is, at the same time, so universally fatal.

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449. *Archives d'anatomie pathologique Charcot, Paris.*
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452. *Nouvelle iconographie de la Salpêtrière, Paris.*
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456. *Revista de ciencias médicas, Barcelona.*
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461. *Archivii italiani di laringologia, Naples.*
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464. *Revista di ostetricia e ginecologia, Torino.*
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467. *Bulletin de la Société royale de pharmacie de Bruxelles.*
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507. Giornale italiano delle malattie veneree e della pelle, Milan.
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519. Journal of Materia Medica, New Lebanon, N. Y.
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522. Bullettino medico cremonese, Cremona.
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524. La médecine contemporaine, Paris.
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529. Bulletins et mémoires de la Société française d'ophtalmologie, Paris.
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581. Pharmaceutical Record, London.
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636. Dnevnik obshestva vrachei pri Imperatorskom Kazanskom Universitetie, Kazan.
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 730. Bollettino scientifico, Pavia.
 731. Wiener medicinisches Jahrbuch, Vienna.

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 828. Untersuchungen aus dem physiologischen Institut der Universität, Halle.
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 847. Deroesterreichische Sanitäts-Beamte, Vienna and Berlin.
 848. Mémoires couronnés et autres mémoires publiés par l'Académie royale de médecine de Belgique, Bruxelles.
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 850. Northwestern Medical Journal, Minneapolis.
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 857. Annales de la Asistencia Pública, Buenos Ayres.
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 860. Revue générale des sciences pures et appliquées, Paris.
 861. Oesterreichische aerztliche Vereinszeitung, Vienna.
 862. Bulletin médical de l'Algérie.
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866. Review of Insanity and Nervous Disease, Wauwatosa, Wis.
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868. Journal de médecine, de chirurgie, et de pharmacologie, Bruxelles.
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870. Balneologisches Centralblatt, Leipzig.
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876. L'idrologia e la climatologia medica, Florence.
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885. Sanitarnoe Dielo. Organ obchestven-noi i chastno higienij, St. Petersburg.
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899. Sbornik rabot hygienicheskoi laboratorii Moskovskago Universiteta, Moscow.
900. Rivista generale italiana di clinica medica, Pisa.
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906. Journal of Balneology, New York.
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912. Dental Record, London.
913. Archivio per l'anthropologia e la etnologia, Florence.
914. Journal of Electro-Therapeutics, New York.
915. Rivista d'igiene e sanità pubblica con Bollettino sanitario amministrativo compilato sugli atti ufficiali del ministero dell' interno, Rome.
916. Anales de la real Academia de medicina, Madrid.
917. Boletin de medicina naval, Madrid.
918. Archivos internacionales de laringología, otología, rinología, Paris.
919. Deutsche Revue, Breslau and Berlin.
920. Comptes rendus hebdomadaires des séances de l'Académie des sciences, Paris.
921. Il policlinico, Torino.
922. Correspondenzblatt der Aerztekom-mern und der Aerztevereine der Provinz Brandenburg und des Stadtkreises Berlin.
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924. Reichs-Medicinal-Anzeiger, Leipzig.
 925. Anales del circulo medico argentino, Buenos Ayres.
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 928. Studies from the Laboratory of Physiological Chemistry, Sheffield Scientific School of Yale College, New Haven, Conn.
 929. Repertorio medico-farmacéutico y de ciencias auxiliares, Havana.
 930. Hygienische Rundschau, Berlin.
 931. Gaceta sanitaria de Barcelona.
 932. Journal der pharmacie von Elsass-Löhringen, Strassburg.
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 934. Rivista italiana di terapia e igiene, Piacenza.
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 937. Revue biologique du nord de la France, Lille.
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 948. California Med. Jour., San Francisco.
 949. Chemisches Centralblatt, Leipzig.
 950. Maandblad tegen de vervalschingen, Amsterdam.
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952. Revista farmacéutica, Buenos Ayres.
 953. Pharmaceutische Zeitung, Berlin.
 954. Nederlandsch militair geneeskundig Archief van de Landmacht, Zee-macht, het Oost- end West- Indisch Leger, Leiden.
 955. Archives néerlandaises des sciences exactes et naturelles, Haarlem.
 956. Bollettino del manicomio provinciale di Ferrara.
 957. Gazzetta delle cliniche, Naples.
 958. Archiv für öffentliche gesundheits-pflege in Elsass-Löhringen, Strassburg.
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 960. Physiological Laboratory, Harvard Medical School, Boston.
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 962. Bollettino della reale Accademia medico-chirurgia di Napoli.
 963. Correo médico castellano, Salamanca.
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 966. Physio-Medical Journ., Indianopolis.
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 972. Gyógyszerészeti hetilap, Budapest.
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995. Archiv psychiatrii, neurologii i ssudebnoj psychopatologii. St. Petersburg.
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999. Zeitschrift für Orthopädische Chirurgie, Würzburg.
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1005. Deutsche Zeitschrift für Nervenheilkunde, Heidelberg.
1006. Journal of Comparative Neurology, Granville, Ohio.
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1008. Monatshefte für Chemie.
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1017. American Dermatologist.
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2015. Gerhard. Diseases of Children.
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2022. Mercier. Nervous System and Mind.
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2033. Magalhaes. Filariosis de Wucherer e do respectivo parasita adulto, a Filario Bancrofti-Cobbolt ou Filaria Sanguinis hominis Lewis. Rio Janeiro, 1887.
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2037. Proceedings American Pharmaceutical Association.
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2040. Beard. Spinal Concussion.
2041. Proceedings Twentieth Congress German Surgical Society.
2042. Comptes rendus de la Société de Chirurgie. Paris.
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